

HUMAN ANATOMY
DOUBLE DISSECTION METHOD

FIRST DISSECTION

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BY

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FIRST DISSECTION



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THE DOUBLE DISSECTION METHOD

DURING RECENT YEARS, the advances in medical subjects have imposed an increasingly higher demand upon curricular time in our medical schools. Broad readjustments in teaching schedules have been made necessary, and conspicuous among the changes has been the reduction in time allotted to Gross Anatomy. The former two-year course in Anatomy has been widely restricted to the first year, with a radical cut in the number of hours permitted for its presentation. It seems inevitable that this change will become universal as further development of other subjects continues to increase the pressure upon the curriculum.

The accumulated effect upon the teaching of Anatomy has induced concentration of subject matter until, in many instances, the course is little more than an intensive schedule of anatomical facts to be learned, as difficult and as replete with intricate details at the start as at the finish. In the attempt to maintain a former standard of results, attention seems to have been directed toward preserving the same schedule of required work but in a greatly contracted form.

Another plan, presented here, approaches the problem from a different direction; it aims to retain the earlier standard through increased effectiveness in student effort by remodeling the method of presentation along different pedagogic lines. The inception of this plan was prompted by the change from a two-year course to a one-year course (360 hours) in Anatomy which occurred simultaneously with a complete reorganization of the personnel in the Department of Anatomy, College of Physicians and Surgeons. Thus, the circumstances were far more favorable for a departure from the usual methods of teaching than they would be in institutions where an approved procedure had long been followed under an established régime. The method has been developed under careful observation during the past six years. Its effectiveness has been amply demonstrated in connection with upper-class work, as well as by the results of national and state board examinations. Its popularity among the students has been one of the most notable and gratifying features from the start.

The principal elements of the course, when considered singly, do not involve any radical change from what have been used in other institutions. In combination, however, they form a distinctly different procedure with appreciable advantages. They are briefly summarized as follows:

1. Two dissections of the entire body, the first being restricted to the larger structures and visceral organs, and the second applying chiefly to the vascular and nervous systems with a review of the larger structures.
2. Arrangement of students in pairs (four to a table), the laboratory work being alternated equally between dissection and study of exposed structures.
3. Dissection restricted to a corresponding area on each side of the cadaver, and following a regional sequence.
4. Coördination of lectures with laboratory assignments, thereby avoiding discussion of structures with which the students are unfamiliar.

5. Use of specific directions for dissection and study in order to obtain maximum results within a limited period of time.

6. Dependence on mental receptivity of the students rather than on the didactic efforts of the teachers.

7. Periodic tests to enable students, as well as their teachers, to measure their accomplishments and progress.

The arrangement of having students work in pairs, has several advantages. It permits each student to make two dissections of the human body *without greater expenditure of material* than when four students are assigned to individual parts on two bodies. This opportunity for students to have the experience of two dissections, makes it possible to grade the course from a comparatively elementary start to the more difficult aspects of the subject as their knowledge advances. Moreover, it eliminates the need for repeated lectures, because the field of interest remains uniform throughout the class during the entire course.

Alternate periods of dissection by the partners increases greatly the time they are able to spend in study of the actual anatomical structures. Dissection is an invaluable part of any course in Anatomy, but its full benefits are lost unless the students have sufficient opportunity to study in the laboratory the structures they have exposed. Anatomical knowledge is more accurate and lasting, the more thoroughly it is built upon contemplation and repeated review of actual structures, unhampered by attention to the procedure of dissection. Book study is a valuable supplement to visual study, but it cannot serve as a substitute for the latter.

The completion of two dissections in a course of about 360 hours would not be possible without a precise plan of procedure which minimizes waste of time and effort on the part of students who have had no previous experience. In order that they may cover satisfactorily a subject as extensive as Human Anatomy *within a limited period of time*, some element of direction is necessary.

Since the usual laboratory manuals are not adapted for the present course, it has been necessary to incorporate this guidance in the accompanying directions for laboratory work. Except for recommendations as to study and review, these directions are designed primarily as a part of the mechanical act of dissection; they are not intended to take the place of textbooks or other sources of information. Their purpose is to supply the student with an efficient and orderly plan of dissection, so that a maximum amount of time will be available for study of exposed structures. This latter phase is obviously the important one, because the opportunity is then opened for the student to demonstrate his ability according to his interest and the inspiration he derives from his teachers. Also, the aim has been to make these directions complete and precise, in order that the technical part of laboratory work will require little attention from instructors, thus permitting the latter to employ their time more freely in amplifying physiological, developmental, and clinical considerations which sustain the students' interest upon a more vital and purposeful plane. The "Topics for Discussion" given at the beginning of each chapter, are to be regarded only as suggested subjects for lectures or informal table talks.

As a word of caution, it may be well to note that instructors experienced in the

conventional plan of teaching, find it difficult, at times, to refrain from discussing details of the vascular and nervous structures during the first dissection. Unless they resist this temptation, the work of the first dissection is likely to become so slowed and involved, as to encroach upon the second dissection causing it to be unduly hurried or incomplete. Concentration upon the larger structures and their physiological aspects during the first survey of the human body, will insure greater interest and better results in the detailed studies of the second dissection.

The use of tests at suitable intervals has been found to be very helpful to the students and beneficial to the course as a whole. The experience of many students in previous scholastic work, inclines them toward too much dependence on book study and lack of confidence in their own powers of observation; other students have difficulty in organizing their knowledge. Tests are useful in revealing these, and other weaknesses before the course is far advanced; and it is rare indeed that students are not appreciative of this means of checking against their progress, or fail to use such information toward improvement in their habits of study.

The bones of cadavers used during the first dissection are preserved intact, to be cleaned for mounting, or for study material. In the second dissection, the bones are sacrificed as necessary, to permit students to follow continuity of structures or to study relationships more effectively.

Female cadavers are reserved for the second dissection in order to obtain as large a distribution of them in the laboratory as possible when the students are prepared to gain the greater benefit.

Finally, it may be remarked that the plan of two dissections enables the first one to be readily synchronized with the course in Histology. The rapid rate at which all the gross structures come under consideration permits them to be studied morphologically before they are brought under the microscope.

Deepest appreciation is extended to Professor Samuel R. Detwiler, head of our department, whose support and confidence have been major factors toward the successful development of this course. Likewise, I gratefully acknowledge the interested support and help of Drs. Charles M. Goss, Ernest A. Lampe, and Edward Singer, who, throughout their association with the project, have given most generously of their time and efforts. The coöperation and contributions of Drs. Earl T. Engle, Bern B. Gallaudet, Ruth A. Miller, William M. Rogers, and Raymund L. Zwemer have added materially to its success, and my indebtedness extends to each one of them.

In the preparation of the Laboratory Procedure which embodies the plan of the two dissections, the collaboration of Dr. Lampe and Dr. Singer has been invaluable; their efficient coöperation in that work has continued through successive revisions, as experience suggested to us opportunities for improvement.

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examine undissected parts to note their condition. The field of work should be moistened frequently to prevent drying of the tissues during dissection, especially if artificial light is used near the part.

Keep your knives sharp.

MUSCLES

Knowledge of muscle *action* is the information of greatest clinical value in the study of these structures; this is determined primarily by the position a muscle occupies relative to the joint or joints which it crosses. Details of origin and insertion should be developed only after the functional purpose of each muscle is clearly understood. Nerve supply should be recorded but not dissected or studied until the second dissection.

Procedure

1. Expose cleanly and isolate each muscle as directed.
2. Identify
 - (a) the movable joint or joints interposed between its origin and insertion.
 - (b) the location of the muscle in relation to the axis of movement in each joint.
3. Analyze
 - (a) the range of movement from the usual anatomical position of the part;
 - (b) variation in action as caused by the movement being started from other positions.
4. Identify the areas of origin and insertion.
5. Record the nerve supply and cord roots from which the nerve originates.

BONES

Study a cleaned specimen of the bone with the help of your books, identifying its most important features. Follow this by writing a concise description directly from the specimen without use of books, noting:

1. Type, shape, and location.
2. Bones with which it articulates.
3. Major parts, if such are given recognition.
4. Principal features of each part, including articular surfaces, projections, depressions, foramina, etc.
5. Ossification centers and development.
6. List the muscles that attach to it by origin or insertion.

Check your results against the book description for corrections and completeness. Simple sketches of two aspects of each bone are recommended to display its principal features.

Joints

Your original description of the joints must be obtained from textbooks. Write a concise summary covering the following points:

1. Type of joint, and bones entering into its formation.

2. Range and type of motion permitted.
3. Structural features, meniscus, etc.
4. Capsule and ligaments; their position and attachment.
Sketches are recommended.

VISCERAL ORGANS

Written synopses of the visceral organs may anticipate their exposure as part of preliminary study. These descriptions should be used with your laboratory study of the structures and amplified as seems desirable.

First use an abridged account (atlas or compend) to acquaint yourself with the principal characteristics of a structure; later, for its details and physiological aspects, complete your studies with the textbook.

LABORATORY PROCEDURE

FIRST DISSECTION SUGGESTIONS TO STUDENTS

STUDENTS should not fail to realize that the shortened course in Anatomy is to them a distinct challenge. The reduced amount of time now given to the subject in many of our medical schools, has not been attended by any lowering in the standard of results expected. Earnest efforts have been made to compensate for the loss in time, but in the end, the success of each student depends directly upon himself.

The sincerity of purpose with which he attempts to meet the challenge is not doubted; but of equal importance to his success, is the efficiency he develops in his method of study. The chief fault to be guarded against is too much reliance upon book study. It tends to choke the development of the student's powers of observation and of individual thought—qualities which are as important to his later work as they are essential to his success in the present subject. For this reason, the following recommendations are offered:

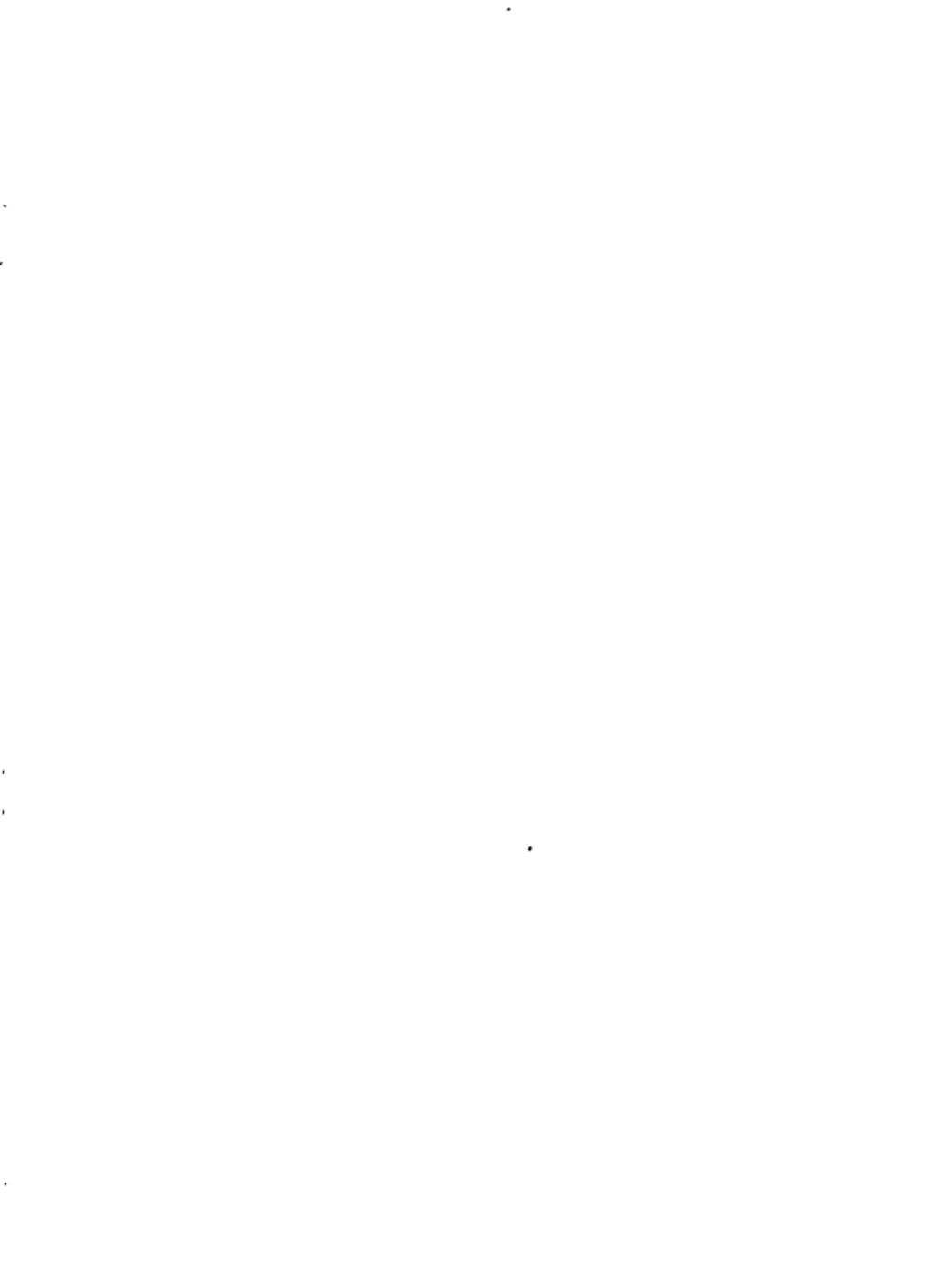
1. Build your knowledge directly upon study of body tissues and not upon book study; use your books as a help to understand what you see.
2. Develop an "x-ray vision," so that you can visualize in any localized area of the body the structures lying beneath the skin and their relative positions.
3. Don't be fascinated by details; acquire first a clear understanding of major aspects, then add the details as supplementary information.
4. Realize that the mere acquaintance with a structure does not constitute knowledge of it. Study and review it repeatedly until you gain a real sense of mastery.
5. Obtain the maximum results from textbook study by writing a well organized synopsis of your information while it is fresh in your mind.

A few other suggestions apply more directly to work in the laboratory:

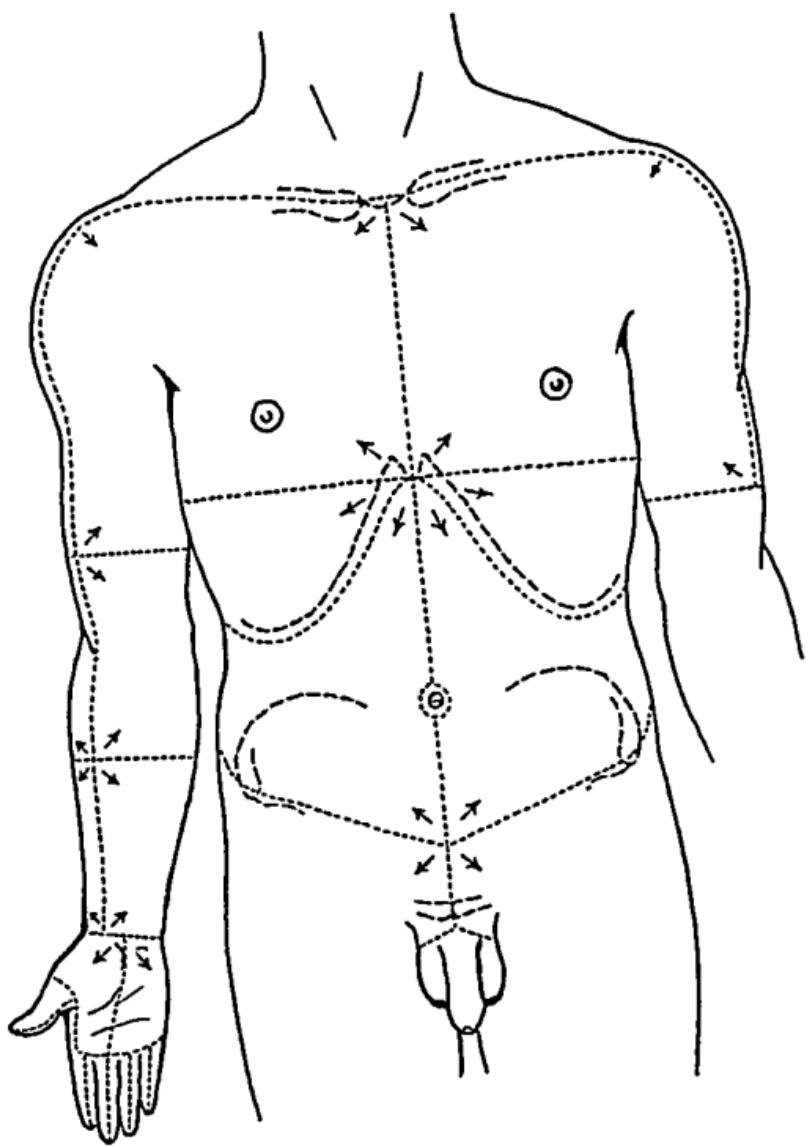
1. Perform your share of the dissection with due regard for your responsibility to your partner. Work together on any difficult parts in the dissection.
2. Reserve your requests for help from instructors until help is really needed; dissection performed by instructors is usually of minor benefit to students.
3. Don't ask information of instructors that is readily available to you in your books if you look for it. What you work for will be yours much longer than the "hard-out."
4. Follow the directions consecutively, identifying in your atlas the position of the structure you are about to seek, *before attempting its exposure*. Your work will proceed much more quickly and effectively.*
5. Your best opportunity to learn Anatomy is during that part of the laboratory period when your partner is dissecting.

Be sure to keep the surface of the cadaver constantly moist, and from time to time

* The in front of each paragraph is for checking as each step is completed. Its use is optional.



FIRST DISSECTION



I

SHOULDER GIRDLE (VENTRAL)

A. TOPICS FOR DISCUSSION. Dissecting Technique.

Tissues. Skin. Superficial and Deep Fasciae. Muscles. Tendons.

B. SPECIAL STUDY

Bones: Clavícula, Scapula, Humerus, Sternum

Joints: Sternoclavicularis; Acromioclavicularis; Scapulohumeralis

Fasciae: Pectoralis, and Coracoclavicularis

Muscles: *Innervation:*

Pectoralis major	Thoracales anteriores, medialis and lateralis
Pectoralis minor	Thoracalis anterior medialis
Subclavius	Subclavius
Serratus anterior	Thoracalis longus

C. INSPECTION AND PALPATION

Identify and outline with skin-pencil on the cadaver the following Regions:
Sternalis; Mammalis; Infraclavicularis; Axillaris; Pectoris lateralis; Inframam-
malis; Deltoides; Acromialis; Brachii anterior; Brachii medialis; Colli anterior;
Colli lateralis.

Locate and identify the following Surface Landmarks:

Incisura jugularis sterni (Supra-sternal notch); Processus xiphoideus; Clavícula;
Acromion; Arcus costae; Sulcus medius; (sternal); Anterior and Posterior
Axillary fold; Fossa axillaris; Border of Pectoralis major muscle; Digitations
of Serratus anterior; Papilla mammae; Fossa infraclavicularis.

D. VARIATIONS TO BE LOOKED FOR IN DISSECTION

M. Sternalis, thin, flat muscle bundle overlying the Pectoralis major.

M. Chondro-epitrochlearis from the lower costal cartilages to the Brachial Fascia
or the medial epicondyle of the Humerus.

E. DIRECTIONS FOR DISSECTION AND STUDY

- i. a. Incise the skin and superficial fascia over the Clavicle from the Incisura jugularis sterni to the tip of the shoulder, and down the outer side of arm two-thirds of the distance to the elbow.
b. Circular incision around the arm, except on its posterior side.
c. Longitudinal incision along the midline of the Sternum to the tip of the Xiphoid Process.
d. Transverse incision across the chest wall from the Xiphoid Process to the posterior Axillary line.

4 SHOULDER GIRDLE (VENTRAL)

2. Starting at the sternal region lift the skin and superficial fascia together to expose the Deep Fascia covering the underlying muscles. Take care to avoid injury to the sheath of the Rectus Abdominalis muscle in the lower anterior part of this area; it is very thin and resembles deep fascia.

Posteriorly, avoid injury to the thin anterior border of the Latissimus Dorsi muscle.

Note the character of the deep fascia covering the muscles.

3. Identify (a) Pectoralis Major, (b) digitations of Serratus Anterior (inferior portion), (c) upper fibers of the External Oblique Abdominal and anterior portion of the Deltoid muscles.
4. Identify the Trigonum Deltoideo-Pectorale (Mohrenheim's Triangle) formed by the adjacent borders of the Pectoralis Major and Deltoid muscles, with its base at the lower border of the Clavicle. The Cephalic Vein emerging through the triangle will help to disclose its location.
5. Clean the surface of the Pectoralis major; then cut the muscle at right angle to its fibers about one-half inch below its clavicular origin and within its sternal and abdominal margins.

In reflecting this muscle, identify its costal attachments on the under surface and carefully expose the Pectoralis Minor muscle and the Fascia Coraco-clavicularis.

6. The Fascia Coracoclavicularis (Clavipectoral Fascia) envelopes the Pectoralis minor, its superficial and deep layers uniting at the upper border of that muscle to extend upward and medially toward the Clavicle and chest wall; at the lower and lateral border of the muscle the two layers unite to extend downward and laterally upon the chest wall and into the Axilla.

The portion above the Pectoralis minor, more specifically called the Costo-coracoid Membrane, splits immediately below the Clavicle, to invest the Subclavius muscles lying beneath that bone.

7. Cut the Costo-coracoid Membrane along its anterior attachments to the lower border of the Clavicle, and reflect to expose a part of the Subclavius muscle for identification.
8. Cut the Fascia along the borders of the Pectoralis Minor and isolate that muscle.
9. Write concise descriptions of the following bones (pages 223-225):
- | | |
|----------|---------|
| Sternum | Humerus |
| Clavicle | Scapula |

BONES

Read Textbook account of the Composition and Development of Bones and Cartilage.

Types. Give two examples of each:

Long.....

Short.....

Flat.....

Irregular.....

Explain the difference between primary and secondary Ossification Centers.

.....
.....
.....

Parts. Give definition:

Condyle.....

Cortex.....

Diaphysis.....

Endosteum.....

Epiphysis.....

Facet.....

Foramen.....

Fossa.....

Incisura.....

Medulla.....

Nutrient Canal.....

Periosteum.....

Sinus.....

Spine.....

Stylus.....

Sulcus.....

Trochanter.....

Tubercle.....

Tuberosity.....

SHOULDER GIRDLE (VENTRAL)

PECTORALIS MAJOR

Joints.....
Position...
.....
Action.....
.....
Origin.....
Insertion.
Nerve Supply. from.....
..... from.....

PECTORALIS MINOR

Joints.....
Position...
Action.
.....
Origin.....
Insertion.
Nerve Supply. from.....

SUBCLAVIUS

Joint.
Position...
Action....
Origin.....
Insertion.
Nerve Supply. from.....

SHOULDER GIRDLE (DORSAL)

A. TOPICS FOR DISCUSSION. Shoulder Girdle and Its Movements. Muscle Actions. Bone Development.

B. SPECIAL STUDY

Fasciae: Ligament Nuchae, Aponeurosis Lumbodorsalis

Muscles: (Posterior)

To Girdle:

Innervation:

Spinoscapular

Accessorius and C 3, 4

Trapezius

Dorsalis scapulae

Levator scapulae*

Rhomboideus major

Rhomboideus minor

Spinohumeral

Thoracodorsalis

Latissimus dorsi

To Humerus:

Axillaris

Deltoideus

Teres minor

Suprascapularis

Supraspinatus

Infraspinatus

Teres major

Subscapularis (lower)

Subscapularis

Subscapularis (upper and lower)

* Also C 3, 4.

C. INSPECTION AND PALPATION (With body face down, block under chest with head and arms hanging.)

Identify and outline on the cadaver the following regions:

Nuchae; Suprascapularis; Scapularis; Deltoidea; Acromialis; Brachialis lateralis; Brachii posterior; Medianus dorsi; Interscapularis; Infrascapularis; Lumbalis.

Locate and identify the following anatomical landmarks:

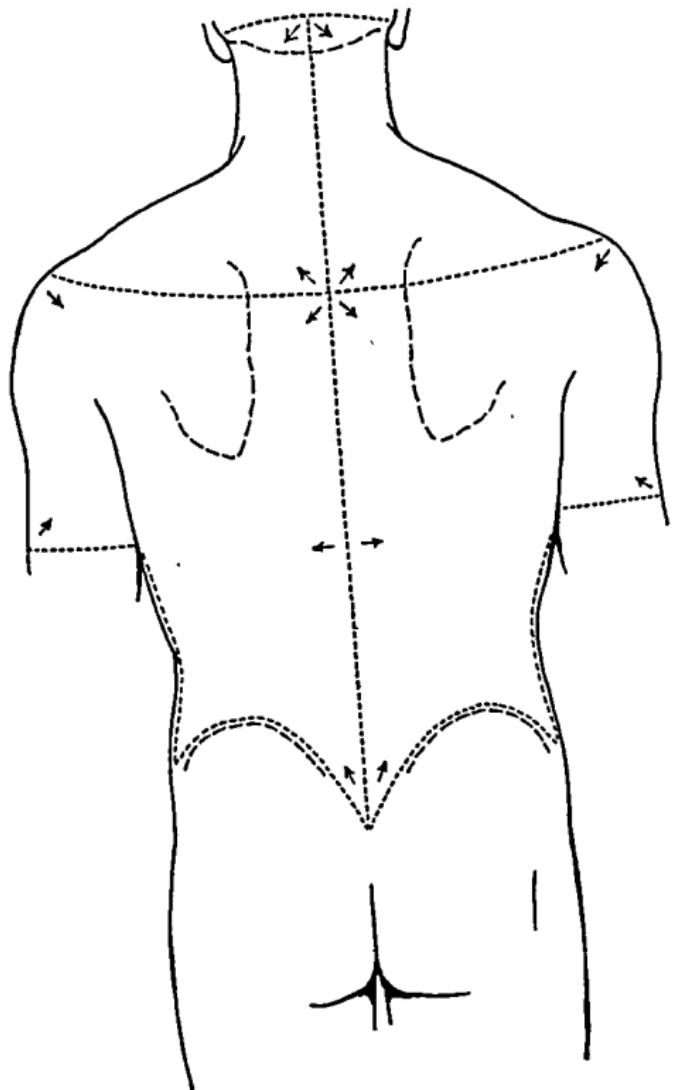
Protuberantia occipitalis externa; Processus mastoideus; Spinal process 7th Cervical vertebra; Spine of scapula; Acromion; Inferior angle of scapula; Spinous processes of vertebrae; Margo vertebralis scapulae; Margo axillaris scapulae; Last rib; Crista ossis illii; Crista sacralis medialis.

D. VARIATIONS TO BE LOOKED FOR

M. Dorso-epitrochlearis (ab Latissimus dorsi). Attached to the medial epicondyle of the Humerus.

M. Occipito-scapularis (cum Rhomboideus) from Superior Nuchal line to the Scapula.

M. Subscapularis minor from axillary border to the lesser tubercle of the Humerus.



E. DIRECTIONS FOR DISSECTION AND STUDY

- 1. a. Incise the skin and superficial fascia across the base of the skull between the Mastoid process of each side at the level of the External Occipital Protuberance.
 b. Carry a midline incision from the center of this cut, downward over the spines of the Vertebrae to the midpoint of the Sacrum.
 c. Transverse incision following the spines of the Scapulae from shoulder tip to shoulder tip.
 d. Lateral incision from the midpoint of the Sacrum carried on each side along the Iliac crest to its midpoint laterally.
- 2. Lift the skin and superficial fascia to expose the superficial muscles of the back and shoulder, extending the dissection to the middle of the arm.

Note how completely the Deep Fascia, continuing from the shoulder and trunk, invests the muscles of the arm.

- 3. Identify and isolate the Trapezius. It and the Latissimus Dorsi comprise the superficial layer of back muscles which attach the upper extremity to the vertebral column.

Identify the four portions of the Trapezius for their distinctive functional value; namely,

Occipito-clavicular	Superior Dorso-scapular
Cervico-clavicular	Inferior Dorso-scapular

- 4. Isolate the Latissimus Dorsi muscle carefully throughout its extent, noting the attachment of some of its fibers to the Scapula.
- 5. Cut through the middle of the fleshy portion of the Trapezius and reflect the flaps.
- 6. Identify and isolate the Rhomboideus Minor and Major, also the Levator Scapulae. They form the second layer of back muscles, attaching the Scapula to the vertebral column.
- 7. Complete the exposure of the Deltoid muscle identifying its three portions and their functional differences.

Spinous (posterior)
Acromial (middle)
Clavicular (anterior)

- 8. Cut the Deltoid within a half inch of its line of origin and reflect downward toward its insertion. Look for the subjacent Bursa Subacromialis.
- 9. From the Acromial process split the fibers of the Trapezius medially to expose and isolate the Supraspinatus; trace its course under the Acromion to its attachment on the Humerus. Identify its action.

10

SHOULDER GIRDLE (DORSAL)

- 10. Expose and isolate:
 - Infraspinatus
 - Teres Major and Minor
 - Triceps (long head)
- 11. Cut the Rhomboids a half inch from their vertebral attachment and lift the Scapula laterally to expose and study the deep surface of the Serratus Anterior and its attachment to the vertebral border of the Scapula.

TRAPEZIUS

Joints.....	.....
Position.....	.....
Action	
Occipitoclavicular.....	.....
Cervicoclavicular.....	.....
Dorsoscapular, superior.....	.....
Dorsoscapular, inferior.....	.....
Origin.....	.....
.....
.....
Insertion.....	.....
.....
Nerve Supply.....	from.....
.....	from.....

LATISSIMUS DORSI

Joints.....	.....
Position.....	.....
Action.....	.....
Origin.....	.....
.....
.....
Insertion.....	.....
Nerve Supply.....	from.....

LEVATOR SCAPULAE

Joints.....	.....
Position.....	.....
Action.....	.....
Origin.....	.....
Insertion.....	.....
Nerve Supply.....	from.....

SHOULDER GIRDLE (DORSAL)

12

RHOMBOIDEUS MINOR

Joints

Position

Action

Origin

Insertion

Nerve Supply

RHOMBOIDEUS MAJOR

Joints

Position

Action

Origin

Insertion

Nerve Supply

DELTOIDEUS

Joint

Position

Action

Clavicular

Acromial

Spinous

Origin

.....

Insertion

Nerve Supply

SUPERSPINATUS

Joint

Position

Action

.....

Origin

Insertion

Nerve Supply

INFRASPINATUS

Joint.....
Position.....
Action.....
.....
Origin.....
Insertion.....
Nerve Supply..... from.....

TERES MINOR

Joint.....
Position.....
Action.....
.....
Origin.....
Insertion.....
Nerve Supply..... from.....

TERES MAJOR

Joint.....
Position.....
Action.....
.....
Origin.....
Insertion.....
Nerve Supply..... from..

SHOULDER GIRDLE AND JOINT (COMPLETED)

A. TOPICS FOR DISCUSSION. Joints and Their Development. Ligaments. Bursae.

B. SPECIAL STUDY

Fasciae: Brachialis

Muscles:

Serratus anterior

Biceps

Coracobrachialis }

Triceps

Innervation:

Thoracalis longus

Musculocutaneus

Radialis

C. VARIATIONS TO BE LOOKED FOR IN DISSECTION

M. Coracobrachialis superior, from the coracoid process to the lesser tubercle of the Humerus.

D. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Turn the cadaver on its back and raise the shoulders with a block placed parallel with the vertebral column.
- 2. Identify the tendon of the Long head of the Biceps and follow it only to the Capsule of the Shoulder Joint.
- 3. Identify and isolate the short head of the Biceps; note the union of the two heads in a single muscle-belly.
- 4. Isolate the Coracobrachialis.
- 5. Extend the dissection upward into the Axilla, cleaning out fatty tissue and exposing the large blood vessels and nerve trunks. Note presence of Lymph Nodes (Lymphoglandulae).
- 6. Identify the Axillary Artery and Vein, and observe their position in the Axilla.
- 7. Identify and note the relative positions of the Median, Musculocutaneous, and Ulnar Nerves.
- 8. Locate the Radial Nerve lying behind the Axillary vessels and trace its course downward to its entrance between the Medial and Lateral heads of the Triceps in the upper third of the arm.
- 9. Isolate the lateral and medial heads of the Triceps muscle on both sides of the arm.
- 10. Cut only the sternal attachment of the Sternocleidomastoid muscle and open the Sternoclavicular joint.

SERRATUS ANTERIOR

Joints.....	.....
Position.....	.....
Action	
Superior .....	.....
Inferior.....	.....
Origin.....	.....
.....
Insertion.....	.....
.....
Nerve Supply.....	from.....

SUBSCAPULARIS

Joint.....	.....
Position.....	.....
Action.....	.....
.....
Origin.....	.....
Insertion.....	.....
Nerve Supply.....	from.....

BICEPS

Joints.....	.....
Position.....	.....
.....
Action (Shoulder)	
Short head.....	.....
Long head.....	.....
Action (Elbow).....	.....
Origin.....	.....
Insertion.....	.....
Nerve Supply.....	from.....

Define and give examples of the following types of joints:

- Diarthrosis.....
.....
Enarthrosis.....
.....
Condylarthrosis.....
.....
Ellipsoidea.....
.....
Ginglymus.....
.....
Trochoidea.....
.....
Arthrodia.....
.....
Symphysis.....
.....
Syndesmosis.....
.....
Synostosis.....
.....
Suture.....
.....
Synchondrosis.....
.....
Amphiarthrosis.....
.....

卷之三

1

I V
A R M

A. TOPICS FOR DISCUSSION. Fascial Compartments.

B. SPECIAL STUDY

Bones: Radius and Ulna

Joints: Cubiti and Radioulnaris superior

Fasciae: Brachialis, Intermuscular septa, and Compartments

<i>Muscles:</i>	<i>Innervation:</i>
Brachialis	Musculocutaneous
Anconeus }	
Subanconeus	Radialis

C. INSPECTION AND PALPATION

Sulcus bicipitalis medialis and lateralis; Fossa cubiti; Fossa olecrani; Olecranon; Epicondylus medialis; Sulcus nervi ulnari; Epicondylus lateralis; Capitum radii; Radius; Ulna; Lateral Angle of extended Elbow (Carrying Angle).

D. DIRECTIONS FOR DISSECTION AND STUDY

- 1. a. Continue incision through skin and superficial fascia on the lateral surface of the arm to four inches below elbow.
b. Cut transversely at this point and reflect the skin and superficial fascia to each side.
- 2. Note the continuation of dense Deep Fascia covering the arm muscles.
- 3. Identify the Medial Intermuscular Septum dipping down from the Deep Fascia between the medial head of the Triceps posteriorly, and the Brachialis and Pronator Teres anteriorly. Its attachment to the Medial Epicondyle of the Humerus serves as part of the origin of the latter muscles.
- 4. Identify the Lacertus Fibrosus, an ulnar extension of fibrous tissue from the Biceps tendon, "Bicipital Fascia," and isolate it by marginal cuts, from the adjacent Deep Fascia.
- 5. Complete the dissection and isolation of:
Biceps
Brachialis
Coracobrachialis
- 6. Identify and isolate the origin of the *Brachioradialis*.
- 7. Identify on the Medial and Lateral Epicondyles, the origins of the flexor and extensor muscle groups of the Forearm.

A R M

- 8. Turn the arm and remove the remainder of skin and fascia from the posterior surface of the Elbow, exposing the heavy flat tendon of the Triceps muscle.
- 9. Identify the Lateral Intermuscular Septum between the Brachioradialis and Extensor Carpi Radialis Longus anteriorly, and the Triceps (medial and lateral heads) posteriorly, as part of the origins of the former two; also, note its attachment to the Lateral Epicondyle.
- 10. Isolate completely the Triceps muscle with its three heads.
- 11. Locate and identify the Anconaeus, under its deep fascial covering on the Lateral Epicondyle, and expose its insertion upon the Ulna.
- 12. Read the description of the Subanconaeus in your textbook and briefly describe it. (Postpone dissection of this muscle on the cadaver until the Joint studies are undertaken, Chapter VIII.)
- 13. Draw a cross section of the arm at the junction of the middle and lower thirds, identifying the Intermuscular Septa and position of the muscles in relation to the Fascial Compartments.
- 14. Review Muscle Actions upon the Shoulder Girdle and Joint as listed in page 16, par. 14, but now include the supplementary action of the arm muscles:
Biceps
Coracobrachialis
Triceps
- 15. Describe the Ulna and Radius on page 225.
- 16. Describe the Elbow, the Proximal and Distal Radioulnar joints on page 253.

SUBANCONAEUS.....
.....
.....
.....

BRACHIALIS

Joint.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....
..... from.....

ANCONAEUS

Joint.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....

v
F O R E A R M

A. TOPICS FOR DISCUSSION. Movements of Forearm and Wrist.

B. SPECIAL STUDY

Bones: Carpalia

 Proximal Row

 Distal Row

 Naviculare (Scaphoid)

 Multangulum majus (Trapezium)

 Lunatum (Semilunar)

 Multangulum minus (Trapezoid)

 Triquetrum (Cuneiform)

 Capitatum (Magnum)

 Pisiforme (Pisiform)

 Hamatum (Unciform)

Joints: Radioulnaris inferior; Radiocarpea

Fasciae: Antibrachii; Ligamenta, carpi transversum, carpi volare, carpi dorsale;
Membrana interossea

Muscles (of Forearm):

Bridging elbow joint (Superficial Groups)

Medial Side:

INNERVATION by N. MEDIANUS

Pronator teres

Flexor carpi radialis

Palmaris longus

Flexor carpi ulnaris*

Flexor digitorum sublimis

Lateral Side:

INNERVATION by N. RADIALIS

Brachioradialis

Extensor carpi radialis longus

Extensor carpi radialis brevis

Extensor digitorum communis

Extensor digiti quinti proprius

Extensor carpi ulnaris

Anconaeus

Supinator (deeper level)

Below Elbow (Deep Groups):

Flexor digitorum profundus†

Abductor pollicis longus

Flexor pollicis longus

Extensor pollicis brevis

Pronator quadratus

Extensor pollicis longus

Extensor indicis proprius

* Innervated by N. Ulnaris. † Medial half, by N. Ulnaris.

C. INSPECTION AND PALPATION

Styleid processes of the Radius and Ulna; note inward deviation of the supinated Hand in relation to the Axis of the Forearm; Thenar and Hypothenar eminences; note their volar prominence to the surface of the Wrist; Palmar creases; Os pisiforme; Hamatum; Naviculare; Anatomical Snuffbox.

D. VARIATIONS TO BE LOOKED FOR

Absence of *Palmaris Longus*.

Variations in tendons of Insertion on the Flexor and Extensor muscles.

Extensor Carpi Radialis Accessorius; from Humerus to the first Metacarpal bone (dorsally).

Extensor Ulnaris Digitii Quinti; from the tendon of the *Extensor carpi ulnaris* to the tendon of the *Extensor digiti quinti*.

Extensor Digiti Medii Proprius; from the *Ulna* to the third (or fourth) digit.

Flexor Carpi Radialis Brevis; from the *Radius* to the palmar surface of the Carpal or Metacarpals.

E. DIRECTIONS FOR DISSECTION AND STUDY

- 1. a. Continue incision of the skin and superficial fascia down the lateral side of the forearm to the proximal margin of the palm.
b. Make a circular incision about the wrist through skin and superficial fascia. (Avoid cutting the superficial tendon of the *Palmaris Longus*.)
- 2. Lift the skin and superficial fascia to expose the Deep (Antibrachial) Fascia. Before proceeding with the dissection, identify by their location with the help of an atlas, the muscles visible through this fascia.
- 3. Expose the tendon of the *Palmaris Longus* and follow it proximally, isolating the belly of this muscle.
- 4. Isolate in the same manner all the other muscles originating in part on the Medial Epicondyle, namely:

Pronator Teres	Flexor Carpi Ulnaris
Flexor Carpi Radialis	Flexor Digitorum Sublimis
- 5. Identify their individual actions upon the undissected hand and fingers by pulling the tendons.
- 6. Carry the dissection more deeply by cutting the radial attachments of the *Pronator Teres* and the *Flexor Digitorum Sublimis*, to identify the *Flexor Pollicis Longus* and *Flexor Digitorum Profundus* originating in the forearm; also the *Pronator Quadratus*. Flex the wrist to facilitate exposure of these muscles.
- 7. Locate the Interosseous Membrane ventrally.
- 8. Starting at the wrist, isolate and study the muscles on the Lateral Epicondyle.

Brachioradialis	Extensor Digiti Quinti Proprius
Extensor Carpi Radialis Longus	Extensor Carpi Ulnaris
Extensor Carpi Radialis Brevis	Anconaeus
Extensor Digitorum Communis	Supinator

- 9. Carry the dissection more deeply by pulling aside the Extensor Digitorum Communis and isolate the remaining muscles of the Forearm.
Extensor Indicis Proprius Extensor Pollicis Brevis
Extensor Pollicis Longus Abductor Pollicis Longus
- 10. Locate the Interosseous Membrane dorsally.
- 11. Identify the tendons forming the Anatomical "Snuffbox" at the base of the thumb.
- 12. Review all muscles bridging the Elbow joint.
Identify all muscles of Supination.
Identify all muscles of Pronation.
- 13. Study muscle actions in Radial flexion (Abduction) of the wrist, and Ulnar flexion (Adduction).
- 14. Review all muscles acting on the wrist joint and digits.
- 15. In a diagrammatic manner, show in a sketch what muscles of the arm and forearm are innervated by each of the four nerves, Median, Musculocutaneous, Ulnar and Radial. Page 24.
- 16. Study the Radiocarpal (Wrist) joint, also the proximal row of Carpal Bones.
Describe the joint on page 253, the bones, on page 227.

FOREARM

PRONATOR TERES

Joints.....

Position.....

Action.....

Origin.....

Insertion.....

Nerve Supply.....

FLEXOR CARPI RADIALIS

Joints.....

Position.....

Action.....

Origin.....

Insertion.....

Nerve Supply.....

PALMARIS LONGUS

Joints.....

Position.....

Action.....

Origin.....

Insertion.....

Nerve Supply.....

FLEXOR CARPI ULMARIS

Joints.....

Position.....

Action.....

Origin.....

Insertion.....

Nerve Supply.....

FLEXOR DIGITORUM SUBLIMIS

Joints.....
Position.....
Action.....
Origins.....
Insertion.....
Nerve Supply..... from.....

FLEXOR POLLICIS LONGUS

Joints.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....

FLEXOR DIGITORUM PROFUNDUS

Joints.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....

PRONATOR QUADRATUS

Joints.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....

FOREARM AND HAND (DORSAL)

A. TOPICS FOR DISCUSSION. Tendon Sheaths.

B. SPECIAL STUDY

Bones: Ossa Metacarpalia and Phalanges

Joints: Radiocarpea; Intercarpeae; Carpometacarpeae; Metacarpophalangeae; Interphalangeae

Fasciae: Aponeurosis dorsalis of Extensor Tendons, Ligamentum carpi dorsalis, Vaginae mucosae (Tendon Sheaths)

Muscles: Muscles originating on Lateral Epicondyle, Extensor muscles of Digits

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. a. Midline incision from the center of the dorsal surface of the wrist to the nail of the middle finger.
b. Transverse incision at the base of the fingers V, IV, III, and II, continued proximally to the base of the thumb.
c. Midline incision from that incision to the nail of each digit.
- 2. Carefully dissect up the skin, noting absence of fat over the dorsum of the hand and fingers.
- 3. Clean and study the Dorsal Carpal Ligament, identifying its six separate channels and the tendons contained in them; namely,
 - a. Abductor Pollicis Longus and Extensor Pollicis Brevis
 - b. Extensor Carpi Radialis, Longus and Brevis
 - c. Pollicis Longus
 - d. Extensor Digitorum Communis and Extensor Indicis Proprius
 - e. Extensor Digiti Quinti Proprius
 - f. Extensor Carpi Ulnaris
- 4. On an outline tracing of your hand and wrist locate and sketch the distribution and extent of the dorsal Tendon Sheaths.
- 5. Isolate the bellies, also the tendons and their aponeurotic prolongations of all the Extensor Muscles of the wrist and digits. Note the uniting bands (Junctura Tendini) of the Digital Extensors. Study the action of each muscle in your own hand.
- 6. Identify the Tendons forming the Anatomical "Snuffbox."
- 7. Loosen the Extensor Tendons on the back of the hand and pull them aside to locate and to identify the Dorsal Interosseous muscles lying between the metacarpal bones.

3 2

FOREARM AND HAND (DORSAL)

- 8. Dissect the nail on the thumb and on one finger to study its structure and matrix.
- 9. Describe the *Carpal bones* on page 227, making sketches of them in position, showing dorsal and palmar views. Also describe the Metacarpals and Phalanges (a) of the Pollex and (b) of the digits. Page 229.
- 10. Study and describe on page 255 the following joints:
 - Intermetacarpal
 - Carpo-Metacarpal of (a) Pollex and (b) of Digits
 - Metacarpo-Phalangeal
 - Interphalangeal

NAILS AND MATRIX

BRACHIORADIALIS

Joints.....
Position.....
Action.....
.....
Origin.....
Insertion.....
Nerve Supply..... from.....

EXTENSOR CARPI RADIALIS LONGUS

Joints.....
Position.....
Action.....
.....
Origin.....
Insertion.....
Nerve Supply..... from.....

EXTENSOR CARPI RADIALIS BREVIS

Joints.....
Position.....
Action.....
.....
Origin.....
Insertion.....
Nerve Supply..... from.....

EXTENSOR DIGITORUM COMMUNIS

Joints.....
Position.....
Action.....
.....
Origin.....
Insertion.....
Nerve Supply..... from.....

3

FOR E A R M A N D H A N D (D O R S A L)

EXTENSOR POLLICIS LONGUS

Joints.....

Position.....

Action.....

Origin.....

Insertion.....

Nerve Supply.....

EXTENSOR INDICIS PROPRIUS

Joints.....

Position.....

Action.....

Origin.....

Insertion.....

Nerve Supply.....

SUPINATOR

Joints

Position.....

Action.....

Origins.....

Insertion.....

Nerve Supply.....

from

from

from

V I I
FOREARM AND HAND (VOLAR)

A. TOPICS FOR DISCUSSION. Hand Musculature. Functional Importance of Thumb.

B. SPECIAL STUDY

Fasciae: Aponeurosis Palmaris, Ligamentum Carpi Volare, Ligamentum Carpi Transversum

Muscles: Flexor muscles originating on Medial Epicondyle and in the Forearm

Thenar Group: *Innervation, N. Medianus*

Abductor pollicis brevis

Flexor pollicis brevis

 Superficial Head

 Deep Head (1st Volar Interosseous)*

Opponens pollicis

Adductor pollicis*

* By N. Ulnaris

Hypothenar Group: *Innervation, N. Ulnaris*

Palmaris brevis

Abductor digiti quinti

Flexor digiti quinti brevis

Opponens digiti quinti

Mid-palmar: *Innervation, N. Ulnaris*

Lumbrales I*, II*, III, IV

Interossei volares

Interossei dorsales

* By N. Medianus

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. a. Mid-palmar incision from the Wrist to the end of the middle finger.
 b. Transverse incision at the base of the fingers and extended to the base of the thumb.
 c. Midline incision on the palmar surface of the thumb and other digits.
- 2. Carefully dissect away the superficial fascia from the Aponeurosis on the ulnar side of the palm noting the fibers of the Palmaris Brevis muscle attached to its medial border. Follow the muscular fibers to their insertion into the skin on the Ulnar border of the hand. Oppose tightly your thumb and little finger to observe the dimpling of skin produced by this muscle.

- 3. Complete the removal of the skin and superficial fascia from the palmar surface of the hand and digits.
- 4. Study the Palmar Aponeurosis—the distribution of its fibers and their insertions. Note the "Fasciculi Transversi."
- 5. Cut the Palmar Aponeurosis along its distal margin and reflect it proximally. Observe that the Palmaris Longus tendon is superficial to the Transverse Carpal Ligament, and partly inserted upon it.
- 6. Clear the Deep Fascia off the muscles of the Thenar Eminence. Isolate the short muscles of the thumb in this area and study:

Abductor Pollicis Brevis

Flexor Pollicis Brevis (Superficial head)

Opponens Pollicis

- 7. Review all of the long muscles attached to the Pollex.
- 8. Similarly, remove the fascia from the Hypotenar Eminence and little finger; isolate and study the short muscles:

Abductor Digiti Quinti

Flexor Digiti Quinti Brevis

Opponens Digiti Quinti

- 9. Cleanly expose the Transverse Carpal Ligament. Note the relations of the tendons in the Carpal Canal, and sketch a cross-section through this level.
- 10. On an outline tracing of your own hand and wrist, sketch the distribution and location of the Volar Tendon Sheaths.
- 11. Isolate and study the Lumbrical muscles and determine their action.
- 12. Cut the Transverse Carpal Ligament and lift the tendons from the Canal; slit the ligamentous channels retaining the long flexor tendons of the digits.
- 13. Pull aside the long Flexor tendons to expose and isolate the Deep head of the *Flexor Pollicis Brevis*, also the Transverse and Oblique heads of the *Adductor Pollicis*.
- 14. After studying this muscle cut it near its insertion and reflect in order to facilitate isolation and study of the Volar and Dorsal Interosseous. Note the morphological and functional similarity between the deep head of the *Flexor Pollicis Brevis* and the Volar Interosseous muscles.
- 15. Review all the Volar muscles of the Forearm and Hand, reporting any distinct variations or absences.

16. Analyse muscle-actions upon the different joints of the upper extremity, (shoulder girdle, shoulder, elbow, wrist and hand) in different movements or sports. For example:

Chinning a bar	Turning a door knob or key
Underhand bowling	Snapping finger
Rowing	Throwing ball (side arm)
Overhead swimming stroke	Shotput

F O R E A R M A N D H A N D (V O L A R)

ABDUCTOR POLLICIS BREVIS

Joints.....	.....
Position.....	.....
Action.....	.....
Origin.....	.....
Insertion.....	.....
Nerve Supply.....	.....

FLEXOR POLLICIS BREVIS

Joints.....	.....
Position.....	.....
Action.....	.....
Origin (Superficial Head).....	.....
Insertion.....	.....
Origin (Deep Head).....	.....
Insertion.....	.....
Nerve Supply.....	.....
To Deep Head.....	.....

OPPONENS POLLICIS

Joint.....	.....
Position.....	.....
Action.....	.....
Origin.....	.....
Insertion.....	.....
Nerve Supply.....	.....

ABDUCTOR DIGITI QUINTI

Joints.....	.....
Position.....	.....
Action.....	.....
Origin.....	.....
Insertion.....	.....
Nerve Supply.....	.....

FLEXOR DIGITI QUINTI BREVIS

Joints.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....

OPPONENS DIGITI QUINTI

Joint.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....

LUMBRICALES

Joints.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....
..... from.....

ADDUCTOR POLICIS (TWO HEADS)

Joints.....
Position.....
Action.....
Origins.....
Oblique.....
Transverse.....
Insertion.....
Nerve Supply..... from.....

FOREARM AND HAND (VOLAR)

INTEROSSEI VOLARES

INTEROSSEI DORSALES

Nerve Supply..

from

VIII
JOINTS OF UPPER EXTREMITY

Dissection of the Joints is to be undertaken only on one side of the cadaver. It is recommended that one or two simple sketches be made of each joint to show the exact position of the ligaments.

ARTICULATIO STERNOCLAVICULARIS. (Page 251.)

1. As this joint has already been cut into (page 15) it should be reviewed with the help of an atlas, and the effort made to identify its parts:

Articular Disc
Sternoclavicular Anterior Ligament
Sternoclavicular Posterior Ligament
Interclavicular Ligament
Costoclavicular Ligament

2. Note whether the Articular Disc divided the joint completely into two separate cavities.

ARTICULATIO ACROMIOCLAVICULARIS. (Page 251)

3. Expose and identify the Acromioclavicular Ligament and note the amount of motion permitted by this joint.
4. Denude the Coracoid Process to expose the two parts Conoid and Trapezoid, of the Coracoclavicular Ligament and trace them to the Clavicle.
5. Expose the Coracoacromial Ligament. Why is it not considered a ligament of this joint?
6. Cut the clavicular end of the Acromioclavicular Ligament away from the bone to open into the joint.
7. Note presence or absence of a Meniscus.

ARTICULATIO HUMERI. (Page 251.)

8. Cut all the muscles bridging the shoulder joint, taking care in dividing the Subscapular muscle to avoid injury to the joint Capsule. Identify the Bursa Subscapularis between the Capsule of the Joint and the tendon of the Subscapular Muscle.
9. Note the expanse of the Capsule and the entrance of the long head of Biceps tendon.
10. Locate and trace the Coracohumeral Ligament.

- 11. Make a slit in the joint posteriorly and introduce a finger to identify the Superior, Middle and Inferior Glenohumeral ligaments as fibrous bands which reinforce the Capsule anteriorly.
- 12. Note the absence of such ligamentous reinforcement in the inferior portion of the joint Capsule, *the most common place for dislocation of the humeral head.*
- 13. Enlarge the posterior opening to identify the Labrum Glenoidale (ligamentous lip of the Glenoid Cavity).
- 14. Expose and identify the Transverse Humeral Ligament and its attachments.
- 15. Cut the joint Capsule to follow the course of the long Biceps tendon to its attachment. Review the positions of the Glenohumeral ligaments by cutting the Capsule anteriorly.

ARTICULATIO CUBITI AND**A. RADIOLUNARIS PROXIMALIS. (Page 253.)**

- 16. Remove the muscles bridging this joint, using care in cutting away the Brachialis.
- 17. Expose the Radial Collateral Ligament, and the three parts of the Ulnar Collateral Ligament, noting their arrangement and attachments.
- 18. Note the union of the posterior part of the Capsule to the Epicondyles—not completely covering the Fossa or the Olecranon. Identify the fibers of the Subanconaeous muscle.
- 19. Expose the Annular Ligament (orbicular) and Chorda Obliqua.
- 20. Open the Elbow joint with arm extended and continue the dissection into the Proximal Radioulnar Articulation.

- 21. Study the two joints and extent of their Capsules.

ARTICULARIO RADIOLUNARIS DISTALES AND**ARTICULATIO RADIOPARPEA. (Page 253.)**

- 22. Remove the muscles covering the Wrist joint.
- 23. Identify the Volar and Dorsal Radiocarpal Ligaments; also the Radial and Ulnar Collateral Ligaments. Open the joint Capsule and note its extent.
- 24. Identify the Articular Disc between the Ulna and Carpal bones. Note that it completely separates the distal Radioulnar Joint from the Wrist joint (Radiocarpea).

ARTICULATIONES INTERCARPEAE AND

ARTICULATIONES CARPOMETACARPEAE. (Page 255.)

- 25. Separate the Carpal bones and note the continuation of the Radio-carpal Articulation into the Intercarpal joints.

- 26. Study the first Carpometacarpal joint separately.

ARTICULATIONES DIGITORUM MANUS. (Page 255.)

- 27. Identify the Collateral ligaments of these Joints.

- 28. Open the joints of one or two digits and study.

POSTERIOR NECK AND BACK

A. TOPICS FOR DISCUSSION. General Arrangement of the Muscles of the Back.
Functional Characteristics.

B. SPECIAL STUDY

Bones: Vertebrae, Costae, Sacrum, and Coccyx

Joints: Intervertebral; Costal; Suboccipital

Fascia: Aponeurosis Lumbodorsalis

Muscles: (For posterior muscles to Shoulder Girdle and Arm, see Chapter II.)

Third Layer (Costospinal): *Innervation:*

Serratus posterior superior	Intercostales
Serratus posterior inferior	Intercostales

Fourth Layer:

Splenius capitis	Cervicales (middle)
cervicis	Cervicales (lower)

Sacrospinalis

Iliocostalis (lumborum, dorsi, cervicis)	}	From posterior divisions of spinal nerves of corresponding levels
Longissimus (dorsi, cervicis, capitis)		
Spinalis (dorsi, cervicis, capitis)		
Semispinalis (dorsi, cervicis, capitis)		

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Review the two superficial muscles of the back; Trapezius and Latissimus Dorsi.
Also review the three underlying muscles; Levator Scapulae, Rhomboideus Minor and Major.
- 2. Cut the Rhomboidei near their vertebral origin and reflect to expose the Serratus Posterior Superior. Isolate and study this muscle.
- 3. Lift the Scapula laterally to reveal the deeper surface of the Serratus Anterior. Dissect away its fascial covering and study the distribution of its fibers, and areas of their attachment (origins and insertions).
- 4. Divide the tendinous fibers of the Serratus Posterior Superior near the vertebral spines and reflect to observe its costal origins.

P O S T E R I O R N E C K A N D B A C K

- 5. Identify the two parts of the *Splenius*, *Capitis* and *Cervicis*; distinguish their separate and combined actions. Clean and isolate.
- 6. Review the *Levator Scapulae*. Identify its position to the *Scalenus Posterior*, and to the *Splenius Cervicis* and *Longissimus*.
- 7. Starting near the lower angle of the *Scapula* cut the *Latissimus Dorsi* in a curved line at right angles to its fibers. Reflect the origin medially and downward to identify its costal attachments.
- 8. Expose and isolate the *Serratus Posterior Inferior*; note the overlapping of its segments and identify the ribs to which they are attached.
- 9. Make a longitudinal incision through the *Lumbo-dorsal Fascia* near the vertebral spines, and reflect to uncover the *Sacrospinalis* muscle.
- 10. Identify the three major divisions of the *Sacrospinalis* as three parallel muscle tracts.
 - a. *Iliocostalis*
 - b. *Longissimus* lateral
 - c. *Spinalis* middle
 - medial

Note: Each of these divisions has three subdivisions according to location but these subdivisions are not always clearly defined.
- 11. *Iliocostalis* Separate and identify its three subdivisions, *Lumborum*, *Dorsi* and *Cervicis*.
- 12. *Longissimus* Identify and differentiate its three subdivisions, *Dorsi*, *Cervicis* and *Capitis*.
- 13. *Spinalis* Work out its three subdivisions, *Dorsi*, *Cervicis*, and *Capitis*, noting the fusion of the latter portion with the underlying *Semispinalis Capitis*.
- 14. Study and describe the following bones (pages 231-233):
 - Vertebrae
 - Sacrum
 - Coccyx
 - Ribs

Review the *Sternum*.

Briefly describe

FASCIA LUMBODORSALIS

SERRATUS POSTERIOR SUPERIOR

Joints.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....

SERRATUS POSTERIOR INFERIOR

Joints.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....

SPLENIUS CAPITIS

Joints.....
Position.....
Action.....
.....
Origin.....
Insertion.....

SPLENIUS CERVICIS

Origin.....
Insertion.....
Action.....
Nerve Supply (Splenii)..... from.....

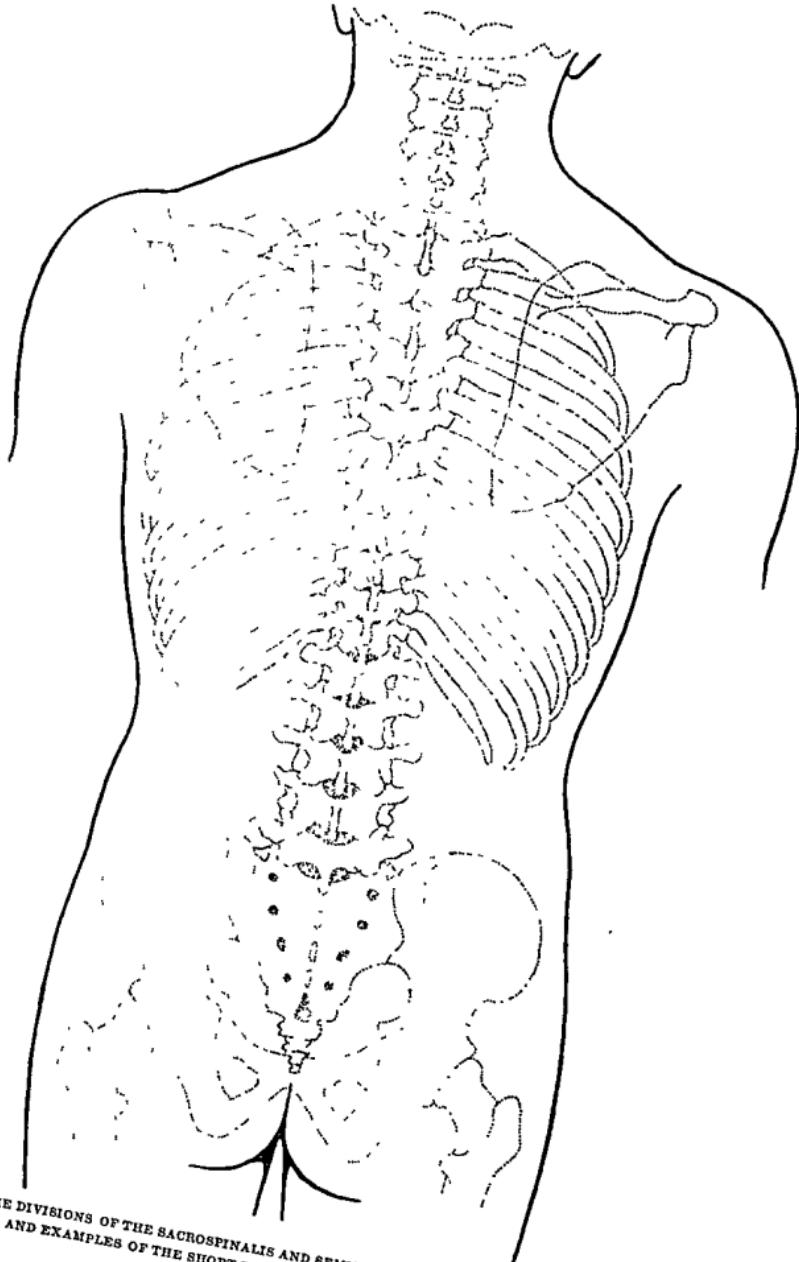
SEMISPINALIS

Joints.....
Position.....
Action.....
.....

Divisions (Origins and Insertions)

Dorsi.....
Cervicis.....
Capitis.....
Nerve Supply..... from.....

Sketch a cross section of the back region showing the bony attachments and the relationship of the Fascia Lumbodorsalis to the muscles of the back.



SKETCH IN THE DIVISIONS OF THE SACROSPINALIS AND SEMISPINALIS MUSCLES ON THE LEFT SIDE,
AND EXAMPLES OF THE SHORT DEEPER MUSCLES ON THE RIGHT SIDE

POSTERIOR NECK AND BACK (CONTINUED)

A. TOPICS FOR DISCUSSION. Clinical considerations. Posture.

B. SPECIAL STUDY

Deep Short Muscles:

Multifidus
 Rotatores, longi and breves
 Interspinales
 Intertransversarii

Levatores costarum,
 longi and breves

Suboccipital:

Rectus capitis major
 Rectus capitis minor
 Obliquus capitis superior
 Obliquus capitis inferior

Innervation:

From the posterior divisions of spinal nerves of corresponding levels

Intercostales

Suboccipitalis

C. DIRECTIONS FOR DISSECTION AND STUDY

Dissection of the deepest muscles of back is to be done only on the right half of the body. The superficial muscles of the left side are to be retained for study and review.

- 1. Remove the Longissimus Dorsi and Cervicis from the right side, leaving the Capitis portion.
- 2. Beneath the Sacrospinalis in the groove on each side of the Vertebral spines, lie in the order listed:
 - a. Semispinalis, Dorsi, Cervicis, and Capitis.
 - b. Multifidus
 - c. Rotatores Longi
 - d. Rotatores Breves

Note: They show a common character in originating from Transverse processes (generally) and inserting on the Spinous processes. They are distinguishable by the number of vertebrae intervening between their origin and insertion, and by the relative depth of their position.

Semispinalis	spans 5 to 7 vertebrae
Multifidus	spans 2 to 4 vertebrae
Rotatores longi*	spans one vertebrae
Rotatores breves	attached to adjacent vertebrae

* Gray and Cunningham include the Rotatores longi in the Multifidus as its deepest fasciculi.

3. Semispinalis, the most superficial of muscles lying in the groove between the transverse and spinous processes of the vertebrae. Expose (on right side only) and identify its three sections, Dorsi, Cervicis and Capitis.

In the fusion of the capital portions of the Semispinalis and Spinalis muscles, the latter will be recognized as the most medial portion through the spinous origin of its fibers.

4. Uncover the fleshy lumbosacral portion of the Multifidus, also isolate one or two of its fasciculi in the thoracic and cervical regions.

5. In the thoracic area expose and isolate two of the Rotatores Longi and Breves.

6. Identify the general characteristics of the Interspinales and Intertransversales.

7. Interspinales

In what regions are these muscles found, and where are they usually arranged in pairs?

.....

.....

8. Intertransversales

In what regions are these muscles found:

Intertransversales posteriores

Intertransversales mediales

Intertransversales anteriores

9. Divide the Semispinalis Capitis near its Occipital attachment and reflect downward. Clean the underlying area exposing:

Rectus Capitis Major

Rectus Capitis Minor

Obliquus Capitis Superior

Obliquus Capitis Inferior

10. Make a sketch showing the position and attachments of these Suboccipital muscles.

11. Describe the Vertebral articulations. (Page 257.)

12. Read up and describe the Costal Cartilages. (Page 233.)

POSTERIOR NECK AND BACK

MULTIFIDUS

Joints.....

Position.....

Action.....

Major Origin.....

Lesser Origins.....

Insertions.....

Nerve Supply.....

ROTATORES LONGI. Briefly describe.**ROTATORES BREVES****INTERSPINALES****INTERTRANSVERSARI****LEVATORES COSTARUM**

Longi.....

Breves.....

RECTUS CAPITIS POSTERIOR MAJOR

Joints.....	.....
Position.....	.....
Action.....	.....
Origin.....	.....
Insertion.....	.....

RECTUS CAPITIS POSTERIOR MINOR

Joints.....	.....
Position.....	.....
Action.....	.....
Origin.....	.....
Insertion.....	.....

OBliquus Capitis Superior

Joints.....	.....
Position.....	.....
Action.....	.....
Origin.....	.....
Insertion.....	.....

OBliquus Capitis Inferior

Joints.....	.....
Position.....	.....
Action.....	.....
Origin.....
Insertion.....

INNERVATION OF SUBOCCIPITAL MUSCLES

Nerve Supply.....	from.....
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X I
THORACIC WALL

A. TOPICS FOR DISCUSSION. Contour and Landmarks of Thorax. Surface Relationship of Thoracic Viscera.

B. SPECIAL STUDY

Bones: Costae, Vertebrae, Sternum, Cartilagines Costales

Joints: Costosternales; Costovertebrales

Fasciae: Intercostalis anterior, Intercostalis posterior, Endothoracica

<i>Muscles:</i>	<i>Innervation:</i>
Intercostales externi	Intercostales
Intercostales interni	Intercostales
Transversus thoracis	Intercostales
Subcostales (inconstant)	Intercostales

C. INSPECTION AND PALPATION (Turn the Cadaver face upward.)

Sternum; Costae; Costal cartilages; Intercostal spaces. Identify each rib; position of the Nipples. Locate the Angulus Sterni (Angle of Louis) at level of the second rib, and more laterally, of the second Intercostal space. Arcus costalis; note the conical shape of the Upper Thorax independent of the shoulder girdle.

D. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Mark a line on the skin one inch below, and parallel with, the lowest rib border; reflect the skin and superficial fascia to that line. Do not extend the dissection further upon the anterior abdominal wall at this time.
- 2. Identify the digitations of the External Oblique Abdominal muscle and the upper fibers of the Rectus on the thoracic wall. Carefully separate the origins of these muscles from the chest wall and reflect downward only far enough to expose the lowest Intercostal Space.
- 3. Cut the Serratus anterior across the middle at right angles to its fibers, and reflect the costal portion to the tips of its digitations on the ribs.
- 4. In two Intercostal Spaces, expose and identify the External Intercostal muscles. Note direction of the fibers, and the origin and insertion of these muscles.
- 5. Observe that only the lowest two External Intercostal muscles occupy the entire intercostal spaces anteriorly; in the upper spaces the fibers stop at the line of the costal cartilages, continuing medially as the thin Anterior Intercostal Fascia.

- 6. Cut the External Intercostals midway between the ribs and reflect to expose the Internal Intercostal muscles. Note the origin, insertion and direction of their fibers.
Note: As will be seen later, the Posterior Intercostal Fascia supplants in a similar manner dorsally, the Internal Intercostal muscles on each side of the vertebral column. This occurs between the line of the tubercles of the ribs medially and the costal angles laterally.
- 7. Carefully cut the Internal Intercostals in the 3rd to 5th Interchondral Spaces, and identify the fibers of the underlying Transversus Thoracis muscle.
- 8. By extending the cuts laterally, note that beyond the Transversus, the Pleura lies immediately beneath the Internal Intercostals with only the thin Fascia Endothoracica intervening.
- 9. Slit the Periosteum and Perichondrium along the middle of the external surface of a rib.
Which is thicker?.....

In the Subsequent Dissection Be Very Careful Not To Break the Ribs

- 10. Cut the Cartilages along the line of their juncture with the ribs, from the first to the sixth inclusive. Turn down this sternal flap, freeing it from the underlying Pleura and Pericardium. In reflecting this flap, attachments between the underlying membranes, the Superior and Inferior Pericardio-sternal Ligaments and the Sternum, will be torn. They should be identified.
- 11. Note the fibers of the Endothoracic Fascia connecting these membranes with the chest wall; they are easily separable except after inflammatory adhesions. Also observe the course of the Internal Mammary vessels running parallel with the sternal borders.
- 12. Study the Transversus Thoracis on the internal surface of the Sternal flap.
- 13. Identify the Pleura, Pericardium and Thymic Fat Body.
- 14. Study the Thymus, or its Residuum, and briefly describe. Describe the Costo-vertebral, Costo-transverse, and Sterno-costal joints. (Page 257.)

INTERCOSTALES EXTERNI

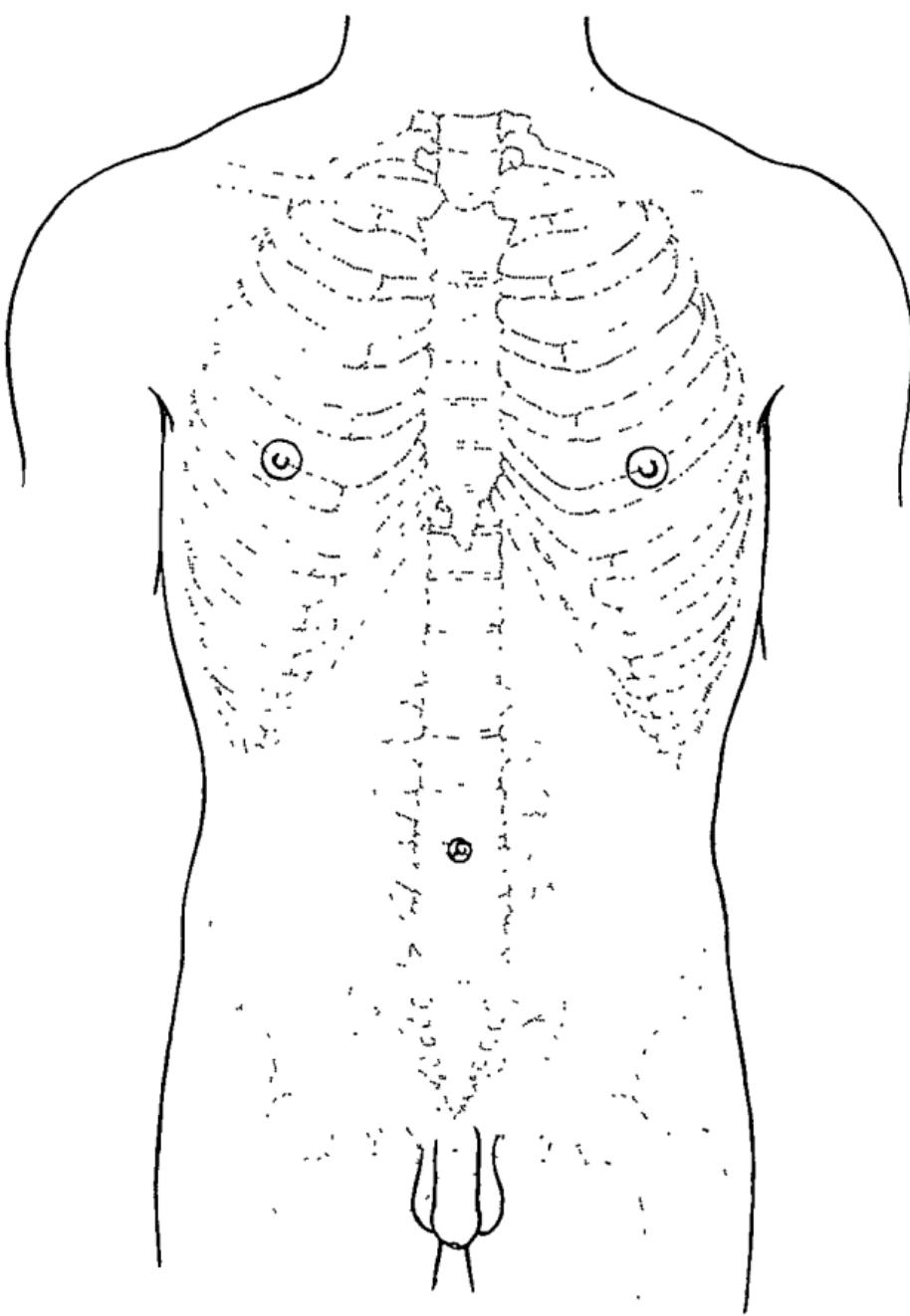
Position.....
Action.....
Origin.....
Insertion..
Nerve Supply..... from.

INTERCOSTALES INTERNI

Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from...

TRANSVERSUS THORACIS

Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply. from...



PLEURA, MEDIASTINUM, AND LUNGS

A. TOPICS FOR DISCUSSION. Pleural Reflections and Mediastinum. Topographic Relations of the Lungs and Heart. Mechanics of Respiration.

B. SPECIAL STUDY

Pleura

Mediastinum

Pulmo

Trachea

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Separate carefully the medial margin of the Pleura of each side from the Pericardium. Note the asymmetry of the pleural margin owing to the position of the Heart toward the left side.
- 2. Replace the Sternal flap and identify the margins of the Pleura in relation to the Sternum and Intercostal Spaces. (Aspiration of the Pericardium.)
- 3. Make a small opening in the anterior surface of the Pleura and identify the surface of the Lung, and the Pleural Cavity. Explore the extent of the cavity, especially to check the line of its medial border.
- 4. Carefully separate the Pleura and Pericardium as far as the root of the Lungs, identifying the entire space between the medial surfaces of the Pleura as the Mediastinum, and those portions of the Pleura as Mediastinal Pleura. The pleural surface lying in contact with the chest wall as previously observed, is called the Costal Pleura.
- 5. Carefully extend the separation of the Pleura downward to its reflection on the Diaphragm, Diaphragmatic Pleura, and as deeply (posteriorly) as possible. Identify the line of the lower reflection of the Pleura in relation to the Ribs, anteriorly, laterally and posteriorly.
- 6. Similarly, carry the separation upward over the Apex of the Lungs to identify its Cupula or Cervical Pleura.
- 7. Make a longitudinal cut the entire length of the Pleura to expose the Lung. At the root of the Lung the Mediastinal Pleura is reflected back to invest the entire Lung as the Visceral Pleura (its skin-like serous surface).

It is thus observed that the Pleura forms a closed sac covering each lung; its entire inner wall being the Visceral Pleura, and the outer wall, known as Parietal Pleura, having sub-titles according to position as noted above.



- 8. Trace the layers of Pleura in cross-sections of the Thorax (atlas) at levels above, through, and below the root of the Lungs. Identify in the cadaver the Pulmonary Ligaments (narrow triangular folds of Pleura) extending downward from the inferior border of the root of each lung. What is the Sinus Costo-mediastinalis? Sinus Phrenico-costalis?
- 9. Identify the Fissures of the Lungs and their position and direction in relation to the ribs on each side.
- 10. Within the Pleural Cavity, cut the root of the Left Lung, and remove the latter for subsequent study.
- 11. **Mediastinum. (Mediastinal Space)**
Identify the level of the Sternal Angle. A transverse plane at that level, sloping slightly upward and backward between the fourth and fifth thoracic vertebrae determines the lower boundary of the Superior Mediastinum.
- 12. Below this plane the Mediastinal space is divided vertically into three parts.
 - a. **Anterior Mediastinum**, a shallow space lying between the Pericardium and the Sternum.
 - b. **Middle Mediastinum**, the space occupied by the Heart and its Pericardium.
 - c. **Posterior Mediastinum**, the space behind the Pericardium and between the Mediastinal Pleura of each Lung.
- 13. Identify and list the contents of the Anterior Mediastinum.
- 14. Remove the Right Lung by cutting it at the Root. Review the entire Parietal Pleura and its divisions, also try to locate the Pulmonary Ligaments.
- 15. Study both Lungs; shape; location, course and depth of its fissures from behind forward.
- 16. Sketch their medial surfaces, showing areas in contact with other structures, and include the cut root of each Lung, with the positions of the Bronchi and Pulmonary Bloodvessels.
- 17. Make longitudinal sections of one of the Lungs, to study its interior and to observe the subdivisions and course of the larger bronchi and vessels.
- 18. Draw the boundaries of the Pleura, Lungs, and their fissures, and the bifurcation of the Trachea on the accompanying chart.

Draw a cross-section sketch of the Thorax through the Root of the Lung, showing Pleural reflections, Pericardial Sac and Mediastinal contents.



PLEURA

LUNGS (Make special note of their respiratory and nutritive blood circulation.)

MECHANICS OF RESPIRATION

XIII
HEART

A. TOPICS FOR DISCUSSION. Topography of the Heart. Pericardium. Poc
natal Circulation of Blood.

B. SPECIAL STUDY

Pericardium

Epicardium

Liquor Pericardii

Cor:

Chambers and Valves

Valvular Muscles

Pectinati

Trabeculae carneae

Papillares

(Chorda Tendinae)

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. a. Make an oblique incision in the Pericardium parallel to its left border extending from the apex of the Heart to the large vessels.
b. From the center of this incision, make a cut at a right angle extending obliquely to the right lower border.
- 2. Observe the fibrous character of the Parietal Pericardium; also identify the Phrenic nerve on each lateral wall of the sac. Reflect the flaps and identify the Epicardium or Visceral Pericardium, on the surface of the Heart.
- 3. Observe that the Pericardium is attached to the large cardiac vessels at variable distances from the base of the Heart. Identify each vessel without extending the dissection.
- 4. Note that the roots of the Ascending Aorta and of the Pulmonary Artery are enclosed in a common pericardial sheath; also that the lower portion of the Superior Vena Cava is invested in a separate sheath.
- 5. Insert your finger between these sheaths and identify the Transverse Pericardial Sinus extending deeply between the Pulmonary Artery and Veins.
- 6. Lift the apex of the Heart and insert your finger upward behind it, into the pouch-like Sinus Oblongatus located between the Left Pulmonary Veins and the Inferior Vena Cava.
- 7. Try to locate the Ligamentum arteriosum stretching between the curvature of the Aortic Arch and the left Pulmonary Artery.
- 8. Within the Pericardial Sac, cut carefully each of the large vessels at the level of their exit through the Pericardium, and remove the Heart.

9. Examine the posterior wall of the Pericardium identifying visually the positions of the Transverse and Oblique Sinuses; also study their positions to the Heart and the roots of its vessels.
10. Identify the posterior fixation structures of the Pericardium:
a. Pericardiovertebral Ligament, from the prevertebral layer of Fascia Cervicalis.
b. Pericardiophrenic Ligaments, from the Diaphragm on either side of the Inferior Vena Cava.
The Anterior bands, Superior and Inferior Pericardiosternal ligaments were severed in reflecting the Sternal flap.
11. Identify on the surface of the Heart and define, the following:

Basis cordis.....

Corpus cordis.....

Apex cordis.....

Incisura apicis cordis.....
.....

Facies diaphragmatica.....

Facies sterno-costalis.....
.....

Conus arteriosus.....
.....

Sulcus terminalis.....
.....

Sulcus longitudinalis anterior.....
.....

Sulcus longitudinalis posterior.....
.....

Sulcus coronarius.....
.....

Atrium sinistrum.....
.....

Auricula sinistra.....
.....

H E A R T

Atrium dextrum.....

 Auricula dextra.....

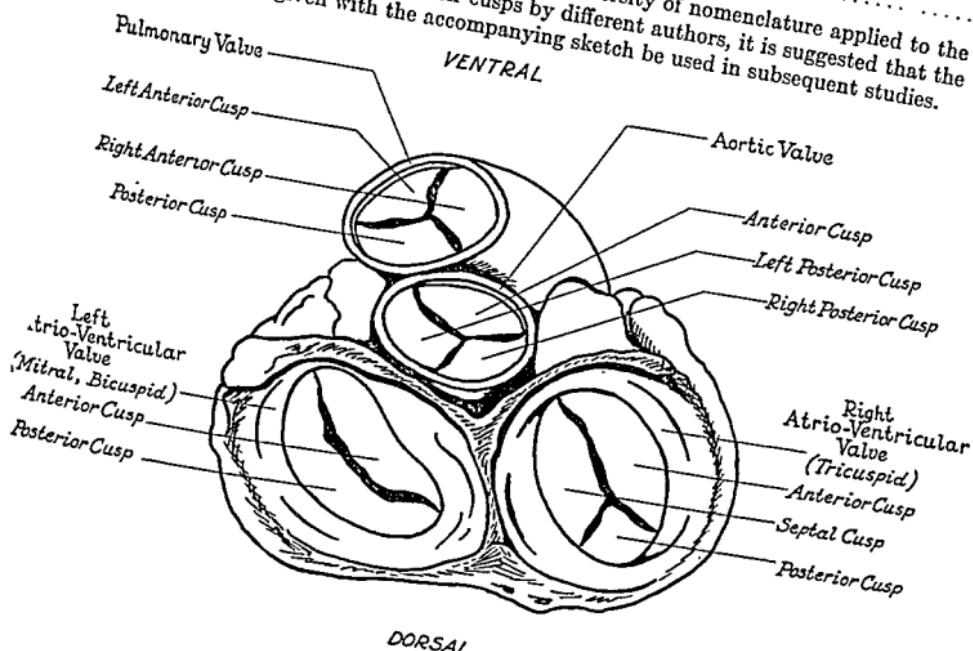
 Ventriculus sinister.....

 Ventriculus dexter.....

 Arteria coronaria dextra (give location).....

 Arteria coronaria sinistra.....

12. In order to avoid confusion due to diversity of nomenclature applied to the Cardiac Valves and their cusps by different authors, it is suggested that the terms given with the accompanying sketch be used in subsequent studies.



OPENING THE HEART

13. a. Right Atrium. With scissors make a vertical cut on the posterior wall of the right Atrium connecting the Superior and Inferior Vena Cavae.
b. At a right angle to the first incision, cut obliquely across the wall of the Right Atrium to the Atrioventricular Septum along the right margin of the Heart.
14. a. Right Ventricle. Open the flaps of the Atrium and continue the cut downward between the Anterior and Posterior Cusps of the Right Atrioventricular Valve and along the right margin through the wall of the Ventricle. (Take care not to injure the Anterior Papillary muscle.)
b. Raise the ventricular flap and turn the direction of the cut upwards following the Septum closely. Extend it between the Left Anterior and Posterior Cusps of the Pulmonary Valve through the length of the Pulmonary Artery. 
15. a. Left Atrium. Connect the Superior Pulmonary veins by a continuous cut.
b. From midpoint in this incision, cut toward the apex of the heart to the Atrio-ventricular septum.
16. a. Left Ventricle. Open the flaps, identifying the Anterior and Posterior Cusps of the Left Atrio-ventricular Valve, and continue the incision between them to the Apex. The left Papillary muscle will be divided.
b. Extend the cut upward through the anterior ventricular wall, following the Interventricular Septum closely.
c. Continue the incision between the Right and Left Posterior Cusps of the Aortic Valve by pulling apart the Pulmonary Artery and the Conus Arteriosus.

Wash the interior of the heart thoroughly.

RIGHT ATRIUM

17. Identify and define the following structures:

Sinus venarum cavarum.....
.....
Crista terminalis.....
.....
Musculi pectinati.....
.....

H E A R T

- Valvula venae cavae (Eustachian).
- Valvula sinus coronarii.
- Fossa ovalis.
- Foramen ovale, (if present)
- Limbus fossae ovalis.
- Tuberculum intervenosum.
- RIGHT VENTRICLE
18. Valvula atrioventricularis dextra (Tricuspid).
- List its cusps and their position.
- Crista supraventricularis.
- Trabecular carneae.
- Musculi papillares.
- Chordae tendineae.
- Atrio-ventricular Bundle.
- Moderator Band.

Pulmonary orifice
Valvula pulmonalis (Pulmonary Semilunar)

Identify its cusps and their position.

Noduli valvularum semilunarium

Lunulae valvularum semilunarium

19. LEFT ATRIUM

Valvula foraminis ovalis (Residuum)

Musculi pectinati

20. LEFT VENTRICLE

Valvula atrio-ventricularis sinistra (Bicuspid)

Identify its cusps and their position.

Valvulae (Semilunaris) aortae

Identify its cusps and their position.

Noduli valvularum semilunarium
.....
Lunulae valvularum semilunarium
.....
.....
.....
Trabeculae carneae
Musculi papillares
Chordae tendineae

- 21. Locate the origin of the Coronary Arteries and trace their course. Also trace the Coronary Veins and identify their point of drainage.
- 22. Study the composition and thickness of the Walls and Septa of the Heart in relation to the intensity of the circulatory function of each chamber. Discuss briefly.

- 23. Sketch on the chart of the Thorax the normal outline of the Heart and indicate the positions of its valves to the Sternum. (Page 60.)
- 24. Draw a diagram showing in detail the course of a blood corpuscle from the Vena Cava to the Aortic Arch.



XIV
MEDIASTINAL STRUCTURES

A. TOPICS FOR DISCUSSION. Clinical Importance of Mediastinal Anatomy.

B. SPECIAL STUDY

Relation of Systemic and Pulmonary Vessels

Aorta Ascendens, Arcus Aortae, Aorta Thoracalis (and branches)

Vena Cava Superior and Branches

Vena Azygos, Hemiazygos

Trachea, Bronchi

Oesophagus

Ductus Thoracicus

Diaphragma

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Remove the Pericardium and Pleura for study of the Posterior Mediastinal Structures.
- 2. Trace the Pulmonary vessels to their cut ends at the root of the Lungs. Identify their position to each other and to the Bronchi; also the course of the Bronchial Arteries.
- 3. Cleanly expose the Aortic Arch and Superior Vena Cava. Note the bulge, "Sinus Quartus," on the right side of the Aorta just above the beginning of the Arch.
- 4. Identify the Right and Left Innominate Veins, also the Innominate, Left Carotid, and Left Subclavian Arteries. Make notes on the position of the Left Innominate Vein to these Arteries, then divide it.
- 5. On the right side, locate the Azygos Vein and identify its point of drainage into the Superior Vena Cava. Note its relation to the root of the Lung.
- 6. Identify the Right Vagus Nerve lying beside the Trachea in the Superior Mediastinum, and trace its fibers downward upon the surface of the Oesophagus. (Detailed consideration of the nerves will be undertaken in the second dissection.)
- 7. Anteriorly, separate the blood vessels to expose the lower end of the Trachea. Identify the vertebral level of its bifurcation.
- 8. Reflect the Trachea upward and clean the anterior surface of the Oesophagus and Descending Aorta as far as the Diaphragm. Identify the Left Vagus Nerve on the left side of the Aortic Arch, and trace its fibers downward on the Oesophagus.

- 9. Pull the Oesophagus forward and locate the Thoracic Duct lying between the Descending Aorta and Azygos Veins. Trace it upward to observe its oblique course toward the left side of the vertebral column about the level of the root of the Lung.
 - 10. Lift the Descending Aorta sufficiently to identify the origins of the Intercostal Arteries. Also locate the Hemiazygos Vein.
 - 11. Identify the Thoracic portion of the Sympathetic Trunk (and its ganglia) running parallel to the bodies of the Vertebrae, and crossing the Intercostal vessels.
 - 12. Study the structure of the Trachea, splitting its posterior wall for a short distance to observe the interior and the extent of its cartilaginous rings. Also study the Bronchi.
 - 13. Study the course, relations and structure of the Oesophagus, splitting a portion of its anterior wall.
 - 14. Identify the Posterior Intercostal Fascia between the medial limit of the Internal Intercostal muscles and the vertebral column on each side.
 - 15. Identify the Subcostal muscles, if present, and briefly describe.
-
.....
.....

- 16. Cleanly expose the thoracic surface of the Diaphragm and study.
- 17. List and review all the structures contained in the Posterior Mediastinum and those which continue through the Diaphragm, identifying their point of passage into the Abdominal Cavity.
- 18. Make a sketch of the Thoracic Aorta and its Arch, showing and labeling all of its branches.



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VENA CAVA

M E D I A S T I N A L S T R U C T U R E S

TRACHEA AND BRONCHI

DIAPHRAGMA

X V
A B D O M I N A L W A L L

A. TOPICS FOR DISCUSSION. Topographic Relationships of Viscera to the Abdominal Wall. Fascial Planes.

B. SPECIAL STUDY

Regions of the Abdomen; Relationships of abdominal viscera to the skeleton and surface of body.

Bones: Pelvis

Fasciae: External

Camper's
Scarpa's
Deep

Internal

Transversalis
Subserous

Muscles:

Rectus abdominis
Pyramidalis
Obliquus externus abdominis
Obliquus internus abdominis
Transversus abdominis
Cremaster
Vagina Recti (Rectus Sheath)
Ligamentum inguinale

Innervation

Intercostales (lower six)
Thoracalis 12
Intercostales (lower six)
Intercostales (lower three) T₁₂, L₁
Intercostales (lower five) T₁₂, L₁
Lumbales 1, 2

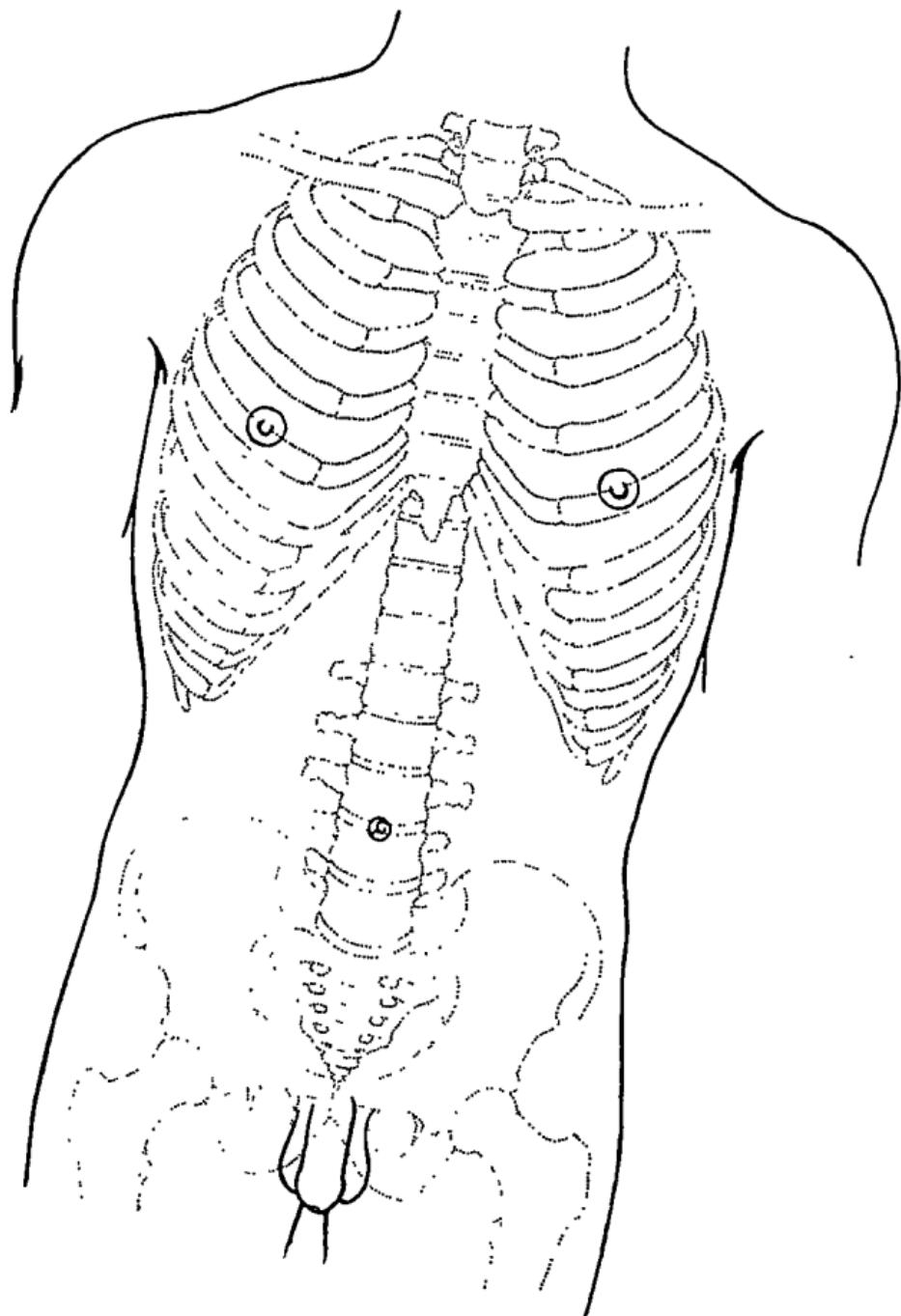
C. INSPECTION AND PALPATION.

Infracostal angle; Processus xiphoideus; 11th and 12th ribs; Symphysis; Os pubis; Ligamentum inguinale; Spina iliaca anterior superior; Crista ossis illii; Fossa epigastrica. Medial furrow over Linea alba; Furrows over the Lineae semilunares; Furrows of Inscriptioeae tendineae; Umbilicus.

Regions of Abdomen: Divide the anterior abdominal surface into regions by drawing the following lines.

- Lateral (vertical) Lines:* Parasagittal lines passing through the mid-point of each Inguinal ligament.
- Intertubercular Line:* A transverse line between the points where each Iliac Crest is crossed by the Mid-axillary line.
- Subcostal Line:* A transverse line touching the lower border of the tenth rib of each side.

Identify and learn the regions formed by these lines, and with help of an Atlas, outline the position of underlying organs on the accompanying chart.



A B D O M I N A L W A L L

Transpyloric Line: A transverse line midway between the Suprasternal Notch and the Os pubis.

Identify the abdominal structures which lie in direct relation to the plane of the Transpyloric Line.

Note: A projection of the Umbilicus upon the Vertebral Column, falls between the 3d and 4th Lumbar vertebrae.

D. DIRECTIONS FOR DISSECTION AND STUDY

Cadaver on back, with block beneath the Lumbar Vertebrae. Tie the sternal flap back into place in order to bring tension upon the abdominal wall.

- 1. a. Medial incision of the skin and superficial fascia from the Xiphoid Process to the Umbilicus.
b. Make a circular cut around the latter, and continue the incision downward two-thirds of the distance from the Umbilicus to the Symphysis Pubis.
c. From the midline at this point make lateral incisions to the Anterior Superior Iliac spines and continue laterally along the Iliac crests to the earlier incision from the back.
- 2. Beginning at the midline of the abdomen, dissect laterally both skin and superficial fascia. Identify the anterior wall of the Rectus Sheath, and expose the External Oblique Abdominal muscle.
- 3. Study the External Oblique muscle and its segments interdigitating with those of the Serratus Anterior and Latissimus Dorsi. Note their respective rib attachments.
- 4. a. Beginning at its posterior border, separate the External Oblique muscle from the underlying Internal Oblique; then cut the former in a line curving forward and upward half way between the rib border and the lateral border of the Rectus muscle.
b. From this curved incision, make a downward diagonal cut (coinciding with the direction of the muscle fibers) to the point where the lateral border of the Rectus sheath passes beneath the undissected skin.
- 5. Reflect the two posterior flaps to expose the Internal Oblique Abdominal muscle, and lift the medial flap to identify the union of the Aponeuroses of the External and Internal Oblique muscles to form the Anterior wall of the Rectus Sheath.
- 6. Identify the origin of the Internal Oblique Abdominal muscle; then in a similar manner, make a curved incision from its posterior border (midway between the 12th Rib and Iliac Crest) curving medially and downward to the same point on the lateral margin of the Rectus Sheath.
From this incision make a second cut following the direction of the muscle fibers medially and upward.

- 7. Reflect the flaps and study the Transverse Abdominal muscle.
- 8. Identify the union of the Aponurosis of the Transverse muscle with that of the Internal Oblique. They join in forming the posterior wall of the Rectus Sheath, as the Aponeurosis of the Internal Oblique splits to enclose both sides of the Rectus.
- 9. Identify the relation of the three lateral abdominal muscles to the Lumbo-dorsal Fascia.
- 10. Make a longitudinal incision along the exposed length of each Rectus Sheath and reflect the flaps to uncover the Recti muscles.
- 11. Identify the *Inscriptiones Tendineae* of the Rectus and study the muscle, identifying its costal and sternal insertions.
- 12. Cut the Recti muscles transversely at the level of the Umbilicus and reflect their halves to expose the posterior wall of the Sheath.
- 13. Study the composition of the Rectus Sheath from the Aponeuroses of the three other abdominal muscles.
- 14. Midway between the Umbilicus and Pubis, the posterior wall of the Rectus Sheath terminates as the *Linea Semicircularis* (Douglasi). Below that level, the aponeuroses of the three muscles lie anterior to the Rectus muscle, and the intra-abdominal *Transversalis Fascia* lies immediately behind it. Try to identify the lower margin (*Linea Semicircularis*) of the posterior wall of the Sheath without disturbing the undissected suprapubic portion of the abdominal wall.
- 15. Make a sketch of the composition of the Rectus Sheath above and below the *Linea Semicircularis*.
- 16. Read up the Superficial Fascia of Abdomen, and describe briefly:
 - Camper's Fascia
 -
 - Scarpa's Fascia
 -
- 17. What are the *Inscriptiones Tendineae*?
- 18. What is the *Linea Semilunaris*?

OBLIQUUS EXTERNUS ABDOMINIS

Joints.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from..

OBLIQUUS INTERNUS ABDOMINIS

Joints.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from..

TRANSVERSUS ABDOMINIS

Joints.....
Position.....
Action.....
Origin.....
.....
Insertion.....
Nerve Supply..... from..

RECTUS ABDOMINIS

Joints.....
Position.....
Action.....
.....
Origin.....
Insertion.....
Nerve Supply..... from..

ABDOMINAL WALL

PYRAMIDALIS ABDOMINIS.

CREMASTER.

LIGAMENTUM INGUINALE (Poupart's).

SCIA TRANSVERSALIS

PERITONEUM AND ABDOMINAL COMPARTMENTS

A. TOPICS FOR DISCUSSION. Peritoneum, Development and Morphology. Peritoneal Folds, Ligaments and Pouches.

B. SPECIAL STUDY

Cavum Peritonei and Bursa Omentalis (Lesser Sac)

Foramen epiploica (Winslow)

Omentum, majus and minus

Mesenterium

Mesocolon

Mesogastricum

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. a. Near the tip of the Xiphoid Process make a small cut; then inserting two fingers of the left hand beneath the Rectus Sheath and the underlying Transversalis Fascia and Peritoneum, make a longitudinal incision about a half inch to the left side of the median line, and continue it to the lower extent of the present dissection.
b. From the Umbilicus, cut transversely to the Crest of the Ilium, at its mid-point on each side.
- 2. Reflect the upper flaps and examine the Falciform Ligament. Also identify the Ligamentum Teres enclosed in it. In the lower flaps, try to identify the Medial and Lateral Vesico-Umbilical Ligaments extending toward the Pubis.
- 3. Separate the fascial layers on the inner side of the Abdominal wall sufficiently to identify the character of the Peritoneum and of the Transversalis Fascia.
- 4. Proceed with a superficial inspection of the undisturbed abdominal organs. Omentum Majus; Colon Transversum; Stomach; Liver; Tip of Gall Bladder; Variable number of Coils of Small Intestine.

EXAMINATION OF THE ABDOMINAL CAVITY AND VISCERA

- 5. Raise the Omentum Majus and holding it tense, observe how the Abdominal Cavity is divided into *superior* (supero-anterior), and *inferior* (postero-inferior) compartments by the Omentum, Transverse Colon and Mesocolon.
- 6. Identify the following portions of the Colon:
Cecum; Colon ascendens; Flexura dextra (hepatica); Colon transversum; Flexura sinistra (splenic); Colon descendens; Flexura sigmoidea.

PERITONEUM

SUPERIOR COMPARTMENT

7. Identify its division into Right and Left halves by the Falciform Ligament extending from the Liver to the Umbilicus.
- Left Side**
8. Insert hand beneath the Diaphragm to the left of the Falciform Ligament and palpate the Left Lobe of the Liver.
9. Identify the Curvatures of the Stomach, the Lesser above, and the Greater below; also the Oesophagus, the Pyloris, and the Pars Superior of the Duodenum.
10. Locate the Spleen posteriorly to the cardiac end of the Stomach and palpate. Note its size and position to the body wall.
11. As the hand grasps the posterior border of the Spleen, note that the back of the fingers comes in contact with the Left Kidney.

RIGHT SIDE

12. Insert hand below the Diaphragm and palpate the anterior and upper surfaces of the Right Lobe of the Liver. Move hand onto the lateral surface to identify its extent.
13. Separate the inferior (anterior) margin of the Liver and the Colon, to expose the Gall Bladder lying against the under surface of the Liver. Also observe the adjacent position of the Duodenum.
14. Insert hand deeply and identify the location of the Right Kidney.

INFERIOR COMPARTMENT

15. Reflect upward the Omentum Majus, Transverse Colon and Mesocolon to expose the coils of the Small Intestine. Pull the Small Intestine toward the right to examine the Mesentery and its attachment to the Posterior Abdominal wall.
- What is the average width of the Mesentery from Intestine to Root?
Follow the course of its Root obliquely downward from the left side of the second Lumbar Vertebra to the Right Iliac Fossa.
16. Note that the Mesentery divides the Inferior Compartment into left and right halves; also that the left half extends directly into the Pelvic Cavity, whereas the lower limit of the right half is located at the junction of the Small and Large Intestines. (Surgical importance—Why?)
17. Palpate the lower poles of the Right and Left Kidneys.

PERITONEUM

- 18. Return all structures to their normal position to make a preliminary study of the Peritoneum with the help of a textbook. Follow its general distribution as it forms the Greater Sac.
- 19. Cut through the Greater Omentum along the Greater Curvature of the Stomach. The opening will lead directly into the Bursa Omentalis (Lesser Sac).
- 20. To locate the Foramen of Winslow, insert finger deeply to the left of the neck of the Gall Bladder, and move it medially along the posterior abdominal wall between the Liver and the Duodenum. It will pass behind the free margin of the Lesser Omentum, through the Foramen and into the Omental Bursa, where it can be seen through the opening in the Greater Omentum previously made.
- 21. With the aid of a textbook or atlas, identify the extent of the peritoneal surfaces of the Bursa Omentalis.
- 22. Pull the Small Intestine to the right and follow the Jejunum upward and posteriorly toward its union with the Duodenum. The small cavity into which the Jejunum disappears is the Recessus Duodeno-Jejunalis.
- 23. By displacing the Colon try to locate and identify the following Recessi:
 - Recessus Ileo-caecalis, Superior and Inferior
 - Recessi Paracolici, variable in number
 - Recessi Intersigmoides, variable in number
- 24. Define the following peritoneal structures, and locate them in the cadaver as far as possible:
 - Plica umbilicalis media
 -
 - Plica umbilicalis lateralis
 -
 - Ligamentum falciforme hepatis
 -
 - Ligamentum teres hepatis
 -
 - Ligamentum hepatogastricum (Lesser Omentum)
 -

PERITONEUM

Ligamentum hepatoduodenale
Ligamentum coronarium
Ligamentum triangularis, dextrum and sinistrum
Ligamentum phrenogastricum
Ligamentum gastrolienale
Ligamentum phrenocolicum
Ligamentum lienorenale
Ligamentum venosum
Plicae gastropancreaticae
OMENTUM MAJUS {Briefly describe.}

OMENTUM MINUS

MESENTERIUM

PERITONEUM (Describe and draw diagrammatic sketches.)

X V I I
A L I M E N T A R Y T R A C T

A. TOPICS FOR DISCUSSION. Form, Length and Divisions of the Tract.
Peristalsis. Mechanics of Food Assimilation.

B. SPECIAL STUDY

Ventriculus
Intestinum tenuie
Intestinum crassum
Processus vermiciformis

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Follow the exposed course of the Alimentary Tract from the Oesophagus to the Rectum, identifying each division including the Appendix. Look for abnormalities and report them.
 - 2. What is a Meckel's Diverticulum, and its origin.
-
.....
.....

- 3. Observe the vascular Arcades of the Mesentery. Draw sketches to identify their pattern in different portions of the Intestine; i.e., by primary, secondary, and tertiary loops.
- 4. Trace the blood vessels of the Small Intestine and Mesentery to the point where the Superior Mesenteric Artery disappears behind the head of the Pancreas.
- 5. Study the Ileocaecal Junction and the position of the Appendix.

SMALL INTESTINE

- 6. About two inches below the Duodeno-jejunal junction and two inches above the Ileocaecal junction, tie off with two parallel knots the Small Intestine and cut between the knots. Remove the Small Intestine by cutting along its mesenteric attachment.
- 7. With the Small Intestine removed, review the continuity of the Mesenteric Peritoneum (right and left sides) especially at its upper and lower limits. Make notes or sketches.
- 8. Open both ends of the Small Intestine, and wash out its contents. Measure its length.

- 9. Make notes on observable differences in the wall of Jejunum and Ileum.
- 10. Observe the course of the blood vessels encircling the gut.
- 11. Slit open the Small Intestine along the attachment of the Mesentery; study the wall and interior.
- 12. Identify and define the following:

Villi.....

Plicae.....

Peyer's Patches.....

.....

Solitary Glands.....

.....

The Duodenum will be considered later.

LARGE INTESTINE

- 13. Review the course and divisions of the Large Intestine.
- 14. Look up the blood supply of the Colon. Locate the position of the Ileocolic, and the Right, Middle, and Left Colic Arteries without disturbing the Peritoneum on the Posterior Abdominal wall.
- 15. Tie off the lower end of the Large Intestine (double) just above the Rectum. Cut between knots and along the Mesocolon about an inch from the Colon.
- 16. Open both ends of the gut and wash out contents. Measure its length.
- 17. Cut open the Caecum and identify:
 - Orifice of the Appendix
 - Valvula ileocaecalis

- 18. Study the walls of the Large Intestine exteriorly.

Identify and define the following:

a. Taeniae longitudinales.....

.....

b. Hausta coli.....

.....

c. Appendices epiploicae.....

.....

19. Note the relation of the Appendix to the Taeniae Longitudinales; also its length and thickness.

.....
Section the Appendix to study its structure.

20. Slit open the entire length of the Colon, and study its walls and interior. Note special characteristics.

.....
.....
.....

STOMACH

21. Study the external conformation of the Stomach and its relation to adjacent structures. Note the position of the Oesophageal orifice to the body of the organ.
22. Identify the Greater and Lesser Curvatures. Review its Peritoneal relations in detail.
23. Explore thoroughly the Omental Bursa, identifying the structures which bound it.
24. Locate the Incisura Angularis, and Sulcus Intermedius (occasionally these are poorly defined). A plane through the Incisura Angularis at right angles to the long axis of the Stomach, divides it into its Cardiac and Pyloric portions.

Identify in the Cardiac portion, the Fundus and Corpus. The Sulcus Intermedius divides the Pyloric portion into the Pyloric Antrum and Pyloric Canal.

25. Identify and trace the blood supply of the Stomach and Omentum.

On Lesser Curvature. Note anastomoses.

Right Gastric Artery (from the Hepatic Artery).

Left Gastric Artery (from the Celiac Artery).

On Greater Curvature. Note anastomoses.

Right Gastro-epiploic Artery (from the Gastroduodenal branch of the Hepatic Artery).

Left Gastro-epiploic Artery (from the Lienal Artery).

Short Gastric Arteries (from the Lienal Artery).

26. Tie off the Stomach at its oesophageal and pyloric ends and cut to remove the organ. Leave the Oesophagus and Duodenum in position.

27. Slit the anterior wall of the Stomach its entire length. Study the walls and the orifices; also its internal surface.

28. How is closure of the Cardiac opening produced?

.....

29. How is the Pyloric opening closed?

.....

30. Make notes on the characteristics of its wall and internal surface.

.....

.....

The Oesophagus will be studied later.

Write a concise description of the Alimentary Tract.

OESOPHAGUS

STOMACH

DUODENUM

JEJUNO-ILEUM

LARGE INTESTINE

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APPENDIX

A L I M E N T A R Y TRACT

RECTUM

X V I I I
OTHER ABDOMINAL VISCERA

A. TOPICS FOR DISCUSSION. Portal Circulation.

B. SPECIAL STUDY

Hepar
Vesica Fellea
Ductus Hepaticus
Ductus Cysticus
Ductus Choledochus
Lien

C. DIRECTIONS FOR DISSECTION AND STUDY

LIVER:

- 1. Review the Peritoneal relations and ligaments of the Liver.
- 2. Study the inferior surface of the Liver, noting its expanse and review its relation to other visceral organs.
- 3. Locate and trace the Cystic, Hepatic and Common bile ducts to the Duodenum. Make a sketch of their course.
- 4. Identify the Hepatic Artery and Portal Vein and their two main branches. Trace them as far as the upper border of the Pancreas.
- 5. Make a cross-section sketch of the Hepatoduodenal Ligament showing its contents.

REMOVAL OF LIVER

- 6. a. First separate the Liver carefully from the Diaphragm, and cut the tensed Falciform Ligament, also the Coronary and Triangular Ligaments.
b. Separate the Gall Bladder from the Liver, leaving it attached to its Cystic Duct.
c. Cut the Portal Vein, Hepatic Artery and Duct near the Liver. Divide the Hepatic Veins, posteriorly, from the Vena Cava.
- 7. Weigh and measure the Liver.
- 8. Identify its Lobes, also the Fissures.
- 9. What is the Porta Hepatis?.....
.....
- 10. Identify all the impressions in the under surface of the Liver corresponding to the contact of adjacent viscera. Make a sketch showing such contact areas.

- 11. Identify the vessels and ducts; their position and entrance in the organ. Follow their course into the organ by removal of necessary tissue. Section a portion of the Liver to study its internal structure.

GALL BLADDER

- 12. Without removal of the Gall Bladder, study its size and shape. Open the wall for study of its structure and interior.

SPLEEN

- 13. Review the Peritoneal relations of the Spleen.
- 14. Study its exact position in relation to the Ribs, and abdominal viscera.
- 15. Identify and trace the arteries and veins of the Spleen.
- 16. Cut the Phrenicolienal Ligament and remove.
- 17. Study its margins and surfaces; also the Porta Lienalis.
- 18. Section the Spleen and identify the capsule, trabeculae, Malpighian Bodies, and the distribution of its blood vessels.
- 19. Sketch the contact areas of its visceral surface. Weigh and measure.

ESOPHAGUS

- 20. Free the Esophagus from the Diaphragm, bringing it into the thoracic cavity. Review its course and relations in the Thorax and section its lower portions for study. Complete its description. (Page 94.)

GALL BLADDER AND DUCTS

XIX
ABDOMINAL CIRCULATION

A. TOPICS FOR DISCUSSION. Systemic and Portal Venous Drainage. Abdominal Lymphatics.

B. SPECIAL STUDY

Aorta abdominalis and its branches
Arterial anastomoses
Vena cava inferior
Venae portae
Lymphoglandulae
Truncus sympatheticus

C. DIRECTIONS FOR DISSECTION AND STUDY

POSTERIOR PARIELTAL PERITONEUM

- 1. Study the distribution of the parietal Peritoneum on the posterior abdominal wall, identifying the "Bare Areas" formed by its reflections upon the following structures.
 - a. Ascending Colon, Hepatic Flexure and right portion of the Transverse Colon.
 - b. Central portion of the Transverse Colon (Root of Transverse Mesocolon).
 - c. Splenic Flexure, Descending Colon, and iliac portion of the Sigmoid Colon.
 - d. Liver.
- 2. Observe that (a) the Mesentery forms the inferior border of the Right Posterior Compartment, separating it from the Right Pelvic Fossa; (b) the Left Posterior Compartment is continuous diagonally with the Right Pelvic Fossa between the Mesenteries of the Small Intestine and of the Pelvic Colon; and (c) the portion of the Posterior Compartment lateral to the Descending Colon, is continuous with the Left Pelvic Fossa.
- 3. Identify without dissection, the location of the following Retroperitoneal structures:
 - a. Duodenum
 - b. Pancreas
 - c. Aorta
 - d. Vena Cava Inferior
 - e. Common Iliac Vessels
 - f. Kidneys, right and left
 - g. Suprarenals, right and left
 - h. Ureters
 - i. Cisterni Chyli
 - j. Crura of the Diaphragm
- 4. Remove the posterior parietal Peritoneum of the Bursa Omentalis and identify the upper part of the Abdominal Aorta and Inferior Vena Cava.

ABDOMINAL CIRCULATION

5. Identify the origins and trace the course of the following arteries as far as possible:

a. Coeliac Axis (Arteria Coeliaca)

Left Gastric

Lienal { Pancreatic branches
 Left Gastro-epiploic
 Short Gastric

Hepatic { Right Gastric
 Gastroduodenal

 { Right Superior Gastro-epiploic
 Pancreatic-duodenal
Left Hepatic
Right Hepatic
Cystic

b. Inferior Phrenic

Superior Suprarenal

c. Superior Mesenteric (origin)

d. Middle Suprarenals

6. Identify the Coeliac Ganglia on each side of the Coeliac Axis.

7. On the right side, starting near the Root of the Mesenterium of the Small Intestine, remove the Peritoneum toward the free margin in order to expose the proximal portions of the branches of the Superior Mesenteric Artery which supply the Small Intestine.

8. Trace them toward their origins and carefully expose the course of the Superior Mesenteric Artery below the Pancreas. Identify the origins of the following branches:

Ileocolic

Right Colic

Middle Colic

(Note accompanying veins and lymph glands, also the Inferior Pancreatico-duodenal artery near the Pancreas.)

9. Cut away the Mesentery parallel to the Superior Mesenteric Artery. (The Arcades may be dissected if time permits.)

10. Remove the posterior parietal Peritoneum from both sides (starting from the Mesenteric root), and expose the Abdominal Aorta and Inferior Vena Cava.

11. On the right side, trace the anastomoses of the Colic Arteries, and expose the Renal and Internal Spermatic Arteries (Ovarian Arteries in the Female), and Veins. Report anomalies of the Renal Arteries.

12. On the left side, identify and trace the following arteries; and accompanying veins.
- a. Inferior Mesenteric (trace the anastomoses of its branches)
 Left Colic
 Sigmoid (2 to 4)
 Superior Hemorrhoidal
 - b. Renal (report supernumerary arteries)
 - c. Internal Spermatic (Ovarian—in females)
13. Make a sketch to show the following Colic arterial anastomoses:
- a. Terminus of Superior Mesenteric with Ileocolic
 - b. Ileocolic with Right Colic
 - c. Right Colic with Middle Colic
 - d. Middle Colic with Left Colic
 - e. Left Colic with Sigmoideae primae
 - f. Intersigmoideae
14. Trace the Inferior Mesenteric Vein to its union with the Lienal Vein; follow the latter to its union with the Superior Mesenteric Vein to form the Portal Vein.

PORTAL CIRCULATION

INFERIOR VENA CAVA

XX
RETROPERITONEAL ORGANS

A. TOPICS FOR DISCUSSION. Primary and Secondary Retroperitoneal Organs.

B. SPECIAL STUDY

Duodenum

Pancreas

Ren

Glandula Suprarenalis

Ureter

Muscles:

Quadratus lumborum

Psoas major

Psoas minor

Iliacus

Innervation:

T₁₂, L_{1,2,3,(4)}

L_{(1),2,3,4}

L_{1,2}

Femoralis

Faciae: Transversalis

Subperitonealis

C. DIRECTIONS FOR DISSECTION AND STUDY

DUODENUM

- 1. Study the position of the Duodenum to adjacent organs and structures.
What is its exact vertebral location?
.....
- 2. Review its Peritoneal relationships.
- 3. Make notes on the means by which the Duodenum is held in position.
- 4. Identify the following portions; Superior, Descending, Transverse, and Ascending.
- 5. Identify its blood supply; and name its arteries.
..... from
..... from
..... from

- 6. Trace the ducts from the Liver and Gall Bladder to the Duodenum.

PANCREAS

- 7. Identify the following divisions of the Pancreas, head, neck, body and tail.
- 8. Draw a sketch showing the position of the Duodenum and Pancreas to the Vertebral column.

RETROPERITONEAL ORGANS

9. State briefly the position of the following structures to the Pancreas:
- a. Duodenum.....
 - b. Common Bile Duct.....
 - c. Aorta.....
 - d. Inferior Vena Cava.....
 - e. Portal Vein.....
 - f. Coeliac Axis.....
 - g. Superior Mesenteric Artery.....
 - h. Ilienal Artery.....
10. Identify and give the blood supply of the Pancreas:

11. What is its nerve supply?.....
12. Remove the Pancreas, Duodenum, Gall Bladder and Bile ducts en masse.

13. Slit the Duodenum along its anterior surface and identify in the Pancreatic Ducts, the Papilla which marks the orifices of the Bile and Pancreatic Ducts.
14. Study the interior surface of the Duodenum, and identify Brunner's Glands.

15. Trace the Pancreatic ducts, Wirsung and Santorini, following them toward their origins for a short distance into the substance of the organ.
16. Make a small sketch to show their relation to the Common Bile Duct.

17. Weigh and measure the Pancreas, then section a portion to study its inner structure. Measure the length of the Duodenum. Complete the description of the Duodenum. (Page 95.)

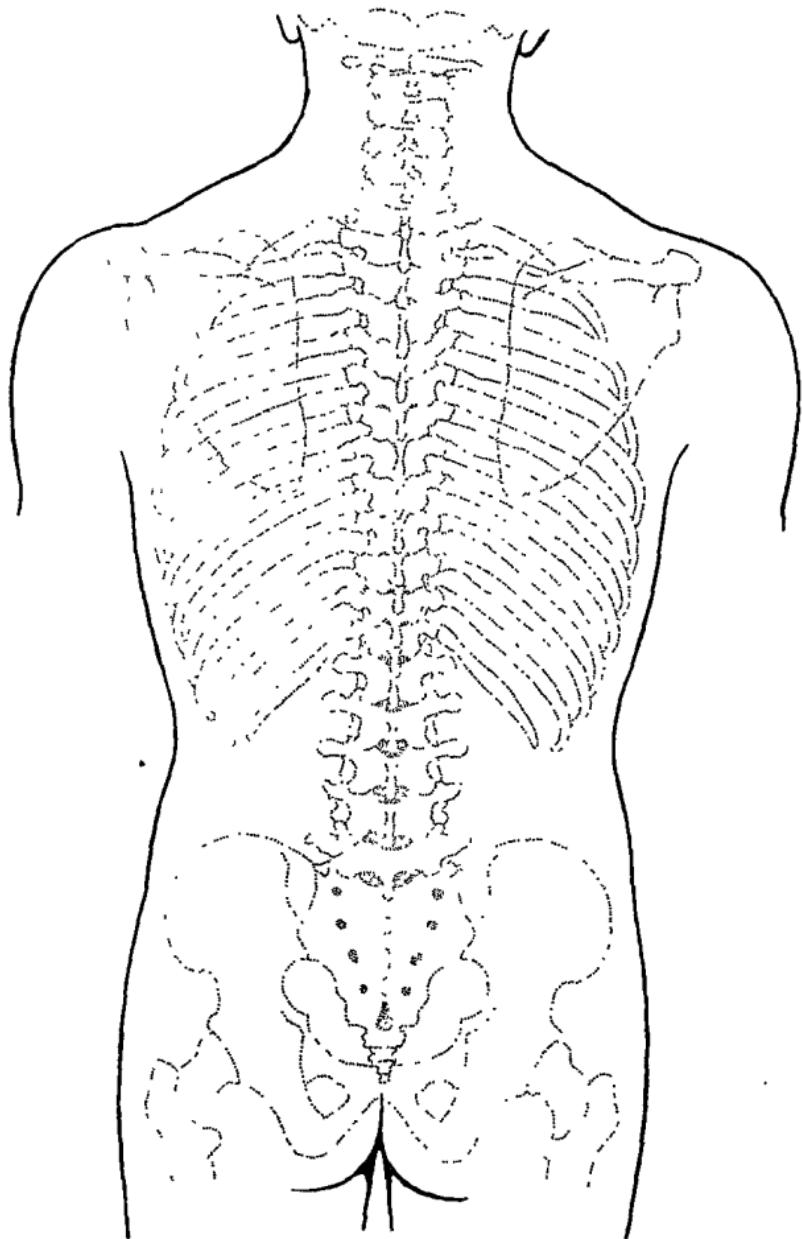
KIDNEYS AND SUPRARENAL GLANDS

18. Note the distribution of the Perirenal fat. Remove this fat and areolar tissue lying anteriorly to the Kidney and identify the fibrous Capsule intimately enveloping the organ.
19. Study the exact location of each Kidney to the posterior abdominal walls, to the ribs, iliac crests, and vertebral column. Also review the visceral relationships.

- 20. Expose the Renal Artery, Vein and Ureter at the pelvis of the Kidney. Note their relative positions to each other. Trace the Ureters to the rim of the True Pelvis.
- 21. Locate the Suprarenal Glands and review their relation to adjacent organs and structures on right and left sides. Expose the Glands by removal of surrounding fat.
Note: The glands are often destroyed in cadavers by post-mortem autolysis.
- 22. Remove them and study their shape and size. Section one of them in order to study the gross appearance of the Cortex and Medulla.
- 23. Cut the fibrous Capsule of the Kidney along the convex margin and strip it from the anterior surface.
- 24. Lift the Kidneys and remove them *partially* by cutting the blood vessels. *Do not cut the Ureters.* Observe that most of the Perirenal fat lies posteriorly.
- 25. Measure the Kidneys, then section *one* Kidney longitudinally from the convex margin toward the Hilus. Study its interior and make a sketch of the section.

POSTERIOR ABDOMINAL WALL

- 26. Remove the remaining retroperitoneal fat (Sub-serous Fascia), and observe the distribution of the Fascia Transversalis to the posterior abdominal wall and to the muscles.
- 27. Expose completely the Aorta, Inferior Vena Cava, Cysterna Chyli and Thoracic Duct. Study their relations to each other and to the Vertebral Column.
- 28. Uncover and study the origin and course of the Psoas Major and Minor (if present) muscles.
- 29. Identify the Lumbar Ganglia of the Sympathetic Chain along the medial border of the Psoas Major.
- 30. Locate the origins and trace the abdominal course of Vena Azygos and Vena Hemiazygos.
- 31. Expose and study the Quadratus Lumborum.
- 32. Uncover and trace the Iliacus muscle as far as the rim of the true Pelvis.
- 33. Study the Diaphragm in its entirety on both thoracic and abdominal sides, making a sketch to show where structures pass between the two cavities.
- 34. Make a sketch of the Abdominal Aorta and Inferior Vena Cava showing the origin of their branches.
Draw on the accompanying chart the position of the visceral organs, thoracic, and abdominal.



R E T R O P E R I T O N E A L O R G A N S

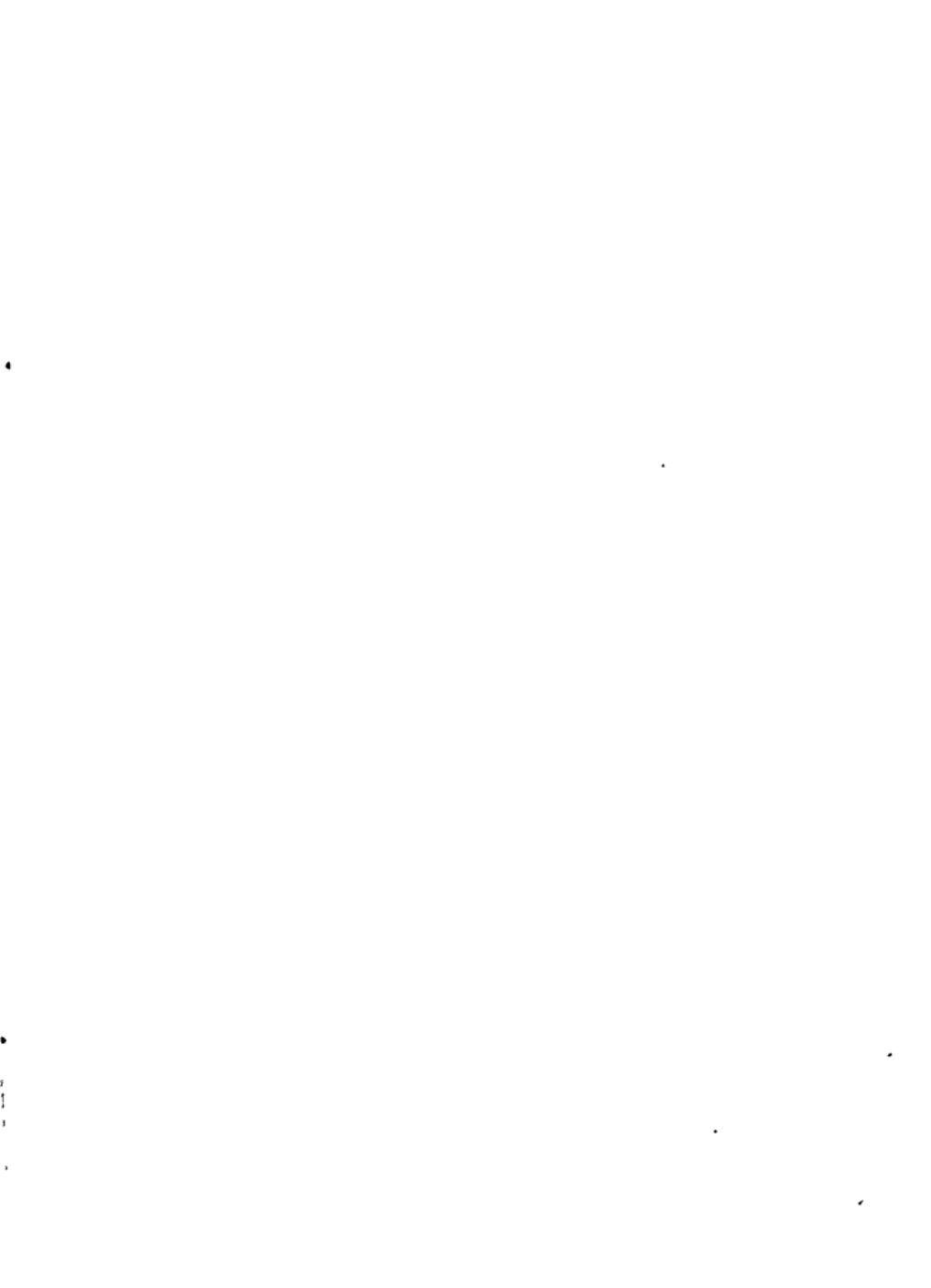
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PANCREAS

KIDNEYS

SUPRARENAL GLANDS

QUADRATUS LUMBORUM



X X I

INGUINAL CANAL AND TESTES

A. TOPICS FOR DISCUSSION. Inguinal Herniae. Descent of Testes.

B. SPECIAL STUDY

Ligamentum inguinale (Poupart's)
Canalis inguinalis
Annulus inguinalis subcutaneous (External Ring)
Annulus inguinalis abdominalis (Internal Ring)
Fovea inguinalis lateralis and medialis
Funiculus spermaticus (Spermatic Cord)
Testes

C. INSPECTION AND PALPATION

Testes; Funiculus Spermaticus; Lymph glands in groin. Insert finger into the Canalis Inguinalis and by invaginating the Scrotum, palpate the Annulus Inguinalis Subcutaneous just lateral to the Pubic Tubercl.

D. DIRECTIONS FOR DISSECTION AND STUDY

- 1. a. Make a midline skin incision downward to the base of the Penis, then a short obliquely-lateral one to each side of the root of the Scrotum on page 2.
b. Identify the line of the Inguinal Ligament and reflect only the skin to a half-inch below that line.
- 2. Similarly cut and reflect Camper's Fascia and identify Scarpa's Fascia, a thin, deeper, more fibrous layer, which overlies the true Deep Fascia of this region. Try to identify the Suspensory Ligament of the Penis.
- 3. Then, in turn, reflect Scarpa's Fascia and the Deep Fascia to expose the External Oblique Abdominal muscle, the External Inguinal Ring and the Spermatic Cord. In females, the terminal portion of the Round Ligament passes through the Inguinal Canal.
- 4. Observe the formation of the External Inguinal Ring by a splitting of the Aponeurosis of the External Oblique muscle. Identify the Superior, and Inferior Crura; also the Intercrural Fibers which reinforce the lateral margin of the Ring.

INGUINAL CANAL

- 5. Separate the lower undissected portion of the External Oblique Abdominal muscle from the underlying Internal Oblique; then cut its Aponeurosis near the lateral border of the Rectus sheath, to a point one-half inch from the Canal. Reflect the flap being careful not to destroy the Superior Crus.

- 6. Observe that the lower part of the Aponeurosis of the External Oblique Abdominal muscle *alone* forms the anterior wall in the medial two-thirds of the Canal. The lateral third of the anterior wall is reinforced by the lowest portion of the Internal Oblique Abdominal Muscle.
- 7. Identify the origin and fibers of the Cremaster muscle and their continuation upon the cord.
- 8. Carefully cut the portion of the Internal Oblique muscle originating on the Inguinal Ligament from the ligament and reflect it upward to identify its fusion with the Transverse Abdominal muscle to form the Conjoined Tendon.
- 9. Observe that the fusion of these muscles forms the Roof of the Canal, and that the Conjoined Tendon continues medially and downward as the Falx Inguinalis to form the posterior wall of the Canal behind the External Ring. It is attached to the crest of the Pubis and to the Pectineal Line.
- 10. Try to identify fibers of the Reflected Inguinal Ligament overlying the medial end of the Falx. Look up their origin.
- 11. The Inguinal Ligament is the thickened inferior border of the Aponeurosis of the External Oblique Abdominal muscle turning posteriorly upon itself. It forms the Floor of the Canal.
- 12. Lateral to the Inguinal Falx, the posterior wall of the Canal consists only of Transversalis Fascia, although reinforced on the medial margin of the Internal Abdominal Ring, by the Interfoveolar Ligament (Hesselbach's).
- 13. Identify the Interfoveolar Ligament, making note of its position and attachments.

Intra-abdominal aspect

- 14. Within the abdomen, separate by blunt dissection the Peritoneum and Extra-peritoneal Fat from the inner surface of the Transversalis Fascia. Identify the adjacent Inferior Epigastric Artery.
- 15. Try to locate the Lateral and Medial Inguinal Fovea; also the intervening Interfoveolar Ligament.
- 16. Hesselbach's Triangle. Identify its boundaries:
 - Medial: Rectus Abdominis (lateral border)
 - Lateral: Inferior Epigastric Artery
 - Inferior: Inguinal Ligament
- 17. Split vertically the lowest portion of the Rectus Sheath. Identify and isolate the Pyramidalis Abdominis muscle.

SPERMATIC CORD AND ITS COVERINGS (See next page.)

- 18. Following the anterior surface of the Cord and Testicle, incise the skin of the Scrotum and reflect. The Dartos, a continuation of Scarpa's Fascia, and containing smooth muscle fibers, is recognized by its pale pink color. Trace medially to observe that it enters into the formation of the Scrotal Septum.
- 19. Insert a grooved director immediately beneath the Dartos, following the line of the Cord. Cut the Dartos in the groove and reflect it to expose the External Spermatic Fascia.
- 20. Then, because the External and Middle Spermatic Fasciae are intimately connected, raise them together in the same manner separating them from the Cremasteric layer to which they are attached by loose connective tissue. Cut and reflect.
- 21. Try to trace the continuity of the External and Middle Spermatic Fasciae upon the abdominal wall. Also the Cremasteric Fibers.
- 22. Lift from the Scrotum, the Testes and Cord now covered with the Cremasteric layer.
- 23. By a similar incision separate the Cremasteric and Internal Spermatic Fasciae as a single layer, from the Cord and Tunica Vaginalis Propria of the Testes.
- 24. Open the Tunica Vaginalis Propria with scissors and study the extent of its cavity, and its Parietal and Visceral surfaces.
- 25. Review and trace the Cord coverings and the corresponding Abdominal Fascial planes.

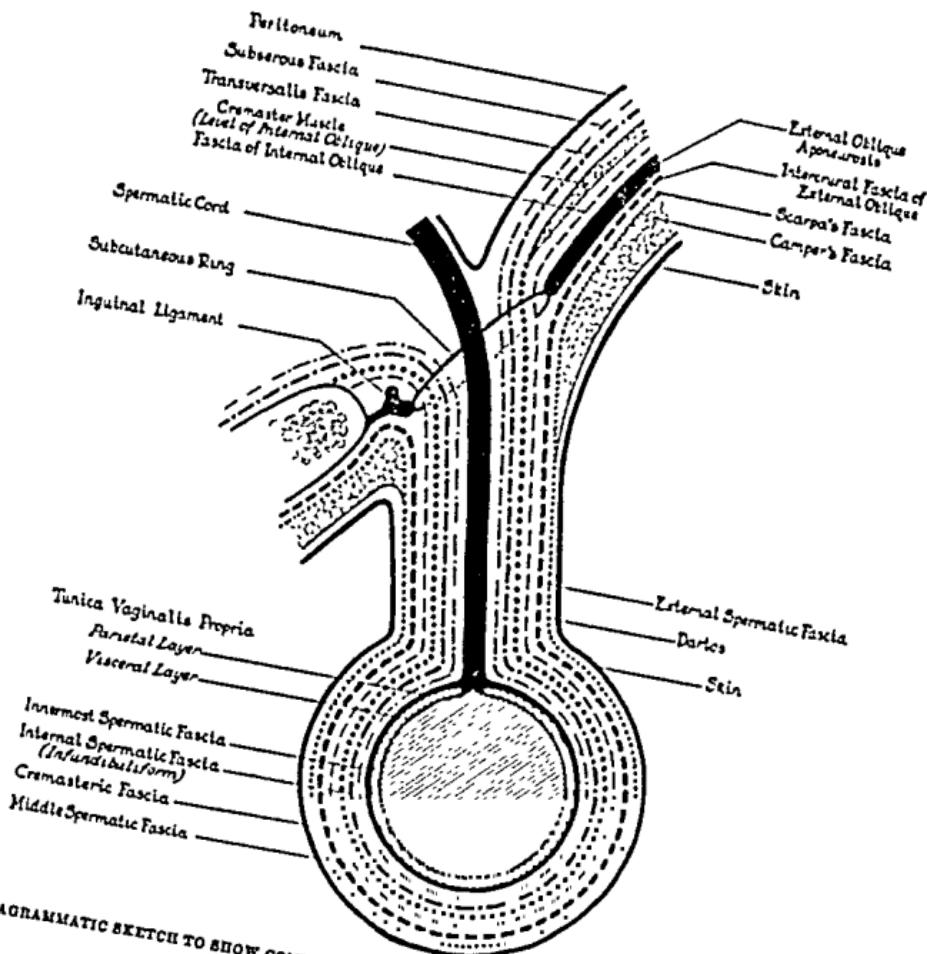
Cord Coverings:

- a. Skin
- b. Dartos
- c. External Spermatic
(Intercrural)
- d. Middle Spermatic
- e. Cremasteric
- f. (1) Internal Spermatic*
(Infundibuliform)
- (2) Innermost Spermatic
- g. (For Testes only)
Tunica Vaginalis Propria

Abdominal Planes:

- Skin
- Scarpa's Fascia
- External Oblique Aponeurosis
- Internal Oblique Fascia
- Internal Oblique Muscle
- Transversalis Fascia
- Subserous Fascia
- Peritoneum

* Tunica Vaginalis Communis.



DIAGRAMMATIC SKETCH TO SHOW CONTINUITY OF THE CORD AND TESTIS WITH THE PLANES OF
THE ABDOMINAL WALL

X X I I
P E R I N E U M

A. TOPICS FOR DISCUSSION. Pelvic Outlet and Sex Differences. Clinical Considerations of the Perineum.

B. SPECIAL STUDY

Diaphragma urogenitalis

Diaphragma pelvis

Bones: Pelvis

Muscles:

Transversus perinei superficialis

Innervation:

Pudendus

Ischiocavernosus

Perinei

Bulbocavernosus

Perinei

Sphincter ani externus

Pudendus

Transversus perinei profundus

Perinei

Sphincter urethrae membranaceae

Perinei

Levator ani

Pudendus, S₄

Coccygeus

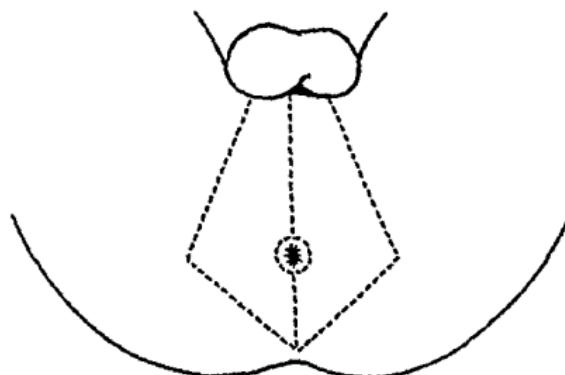
Pudendus

Glands: Bulbo-urethrales; (Female) Vestibulares

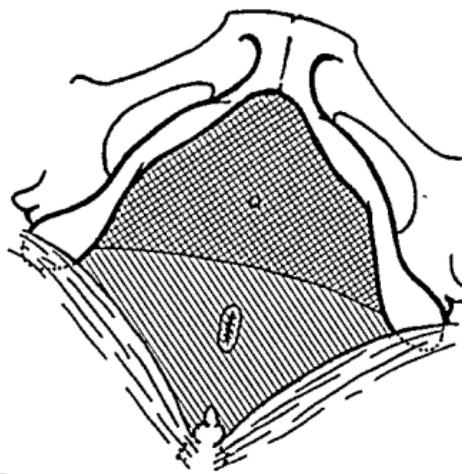
C. INSPECTION AND PALPATION

(Cadaver on back with buttocks brought to end of the table; thighs flexed and abducted with legs fastened to leg racks. Pin the scrotum forward.

Raphe scrota; Raphe perinei; tip of Os coccygeum; Tubera ischiorum. Note presence of any external Hemorrhoids.



PERINEUM



PELVIC OUTLET SHOWING EXTENT OF THE UROGENITAL
AND PELVIC DIAPHRAGMS
OBlique LINES UROGENITAL DIAPHRAGM
OBlique LINES PELVIC DIAPHRAGM

Foreword: Study the conformation of the Pelvic Outlet on a skeleton or prepared Pelvis. This outlet is spanned by the Levator Ani muscle which forms a complete floor to the Pelvis. The muscle, being an intrapelvic structure, is covered on its upper and lower surfaces by continuations of Transversalis Fascia, termed respectively Supra-anal and Infra-anal Fasciae. The muscle and its two fascial coverings form the Pelvic Diaphragm.

Viewing the inferior aspect of the Pelvis (externally), a line between the Ischial tuberosities divides the Pelvic Outlet into two triangular-shaped areas. The anterior area is called the Urogenital Triangle, the posterior area, the Anal Triangle. In the area of the Urogenital Triangle, the Pelvic Diaphragm is reinforced by a number of small muscles and their fasciae, which form a more superficial diaphragm, Urogenital Diaphragm. It overlies only the anterior half of the Pelvic Diaphragm, as its posterior border stretches between the Ischial tuberosities anteriorly to the Anus.

The Anal Triangle includes no such reinforcement; consequently the posterior half of the Pelvic Diaphragm lies directly in contact with the Superficial Fascia of this region.

D. DIRECTIONS FOR DISSECTION AND STUDY

- 1. a. Midline incision of skin from the root of the Scrotum to the Anus.
b. Circular incision around the Anus.
c. Continue midline incision from the Anus posteriorly to one inch beyond the tip of the Coccyx.
d. Oblique cuts from the root of the Scrotum to each Ischial tuberosity, and from there continue obliquely toward the posterior end of the midline incision.
- 2. Dissect only the skin from the Perineum and Anal region noting the superficial position of the fibers of the External Sphincter Ani muscle.

UROGENITAL TRIANGLE

- 3. Remove the fatty layer of superficial fascia (Camper's) from the Urogenital Triangle to uncover the deeper membranous layer (Colles' Fascia). Note the latter's continuity with Scarpa's Fascia of the lower abdominal wall, and with the Dartos of the Scrotum.
- 4. This triangular area, containing the Urogenital Diaphragm and more deeply the anterior half of the Pelvic Diaphragm, has four fascial layers with two intervening spaces. Their positions as approached in dissections, are:
 - a. Colles' Fascia
 - b. Superficial Perineal Pouch* (Spatium Perinei Subcutaneum)
 - c. Deep Fascia
 - d. Deep Perineal Pouch* (Spatium Perinei Profundum)
 - e. Transversalis Fascia (Infra-anal), covering the inferior surface of the Levator Ani
 - f. Levator Ani Muscle
 - g. Transversalis Fascia (Supra-anal), covering the superior (intra-pelvic) surface of the muscle.

* Potential, and not open, spaces.

The three fascial layers (a, c, and e) fuse along the posterior border of the Urogenital Diaphragm thereby forming the posterior boundary of both Superficial and Deep Perineal Pouches.

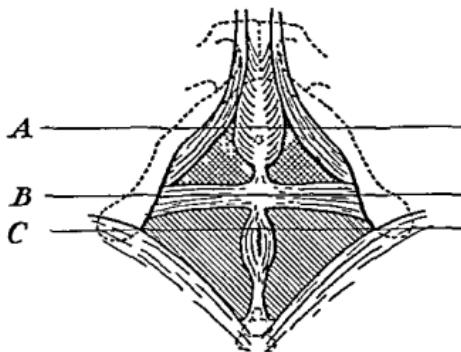
SUPERFICIAL PERINEAL POUCH

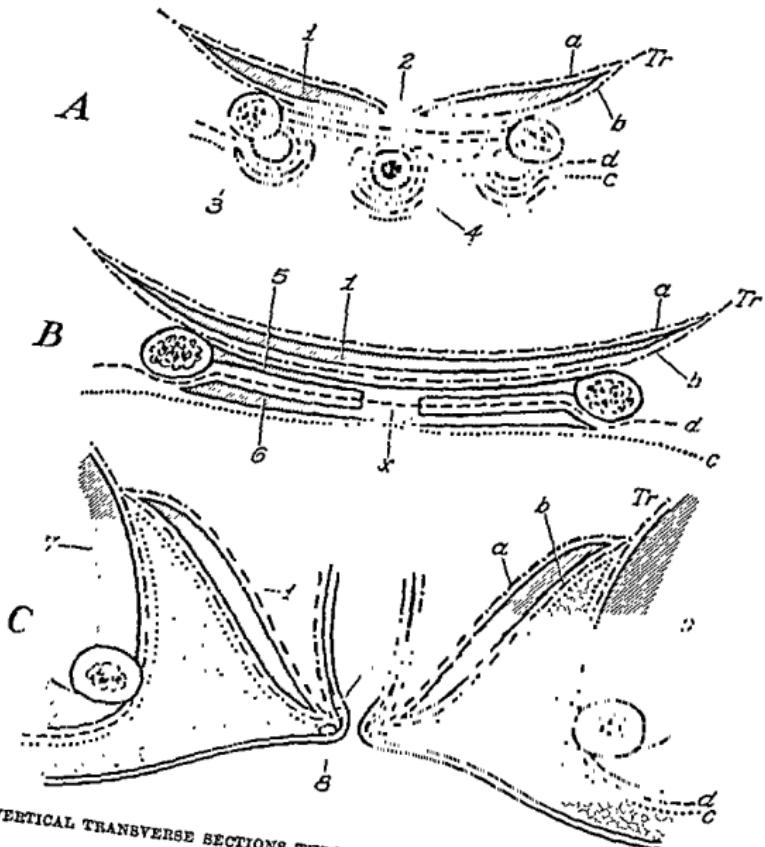
- 5. Identify Colles' Fascia near the root of the Scrotum and separate it from underlying structures by inserting the handle of the scalpel. After exploring the Superficial Space in this manner, cut the Fascia in midline and along the Pubic rami laterally to reflect it toward the posterior limit of the space—the posterior border of the Superficial Transverse Perineal Muscle.
- 6. Identify the "Central Body" or Central Tendinous Point formed by the convergence and fusion of the perineal muscles and fasciae.

7. Study the three muscles contained in the Superficial Perineal Pouch:
- Transversus Perinei Superficialis
 - Bulbocavernosus
 - Ischiocavernosus
8. What clinical significance has the Superficial Pouch?
-
.....
.....

Note: In females, the two glands of Bartholini (Glandulae Vestibulae), are contained in this space. Corresponding glands of Cowper (Glandulae Bulbo-urethrae) in males, lie in the Deep Pouch.

9. Split the Ischiocavernosus muscles to expose the Crura of the Penis and identify their attachment to the Pubic Rami.
10. Dissect up the Bulbocavernosus muscle to uncover the bulbous portion of the Corpus Cavernosum Urethrae.
11. Study the fascia forming the deeper wall of the Superficial Perineal Pouch, identifying it as a continuation of the Deep Fascia of the body wall. It terminates at the posterior border of the Superficial Transverse Perineal muscle, fusing with Colles' Fascia.





VERTICAL TRANSVERSE SECTIONS THROUGH THE PERINEAL REGION ACCORDING
TO KEY SKETCH
A AND B, THROUGH THE UROGENITAL TRIANGLE
C, THROUGH THE ANAL TRIANGLE SHOWING THE ISCHIORECTAL FOSSAE
Fasciae: TR, TRANSVERSALIS; A, SUPRA-ANAL; B, INFRA-ANAL; O, OBTURATOR;
D, DEEP; C, COLLES

Muscles: 1, LEVATOR ANI; 2, SPHINCTER URETHRAE MEMBRANACEAE; 3, ISCHIO-CAVERNOSUS; 4, BULBOCAVERNOSUS; 5, DEEP TRANSVERSE PERINEAL; 6, SUPER-
FICIAL TRANSVERSE PERINEAL; 7, OBTURATOR; 8, EXTERNAL SPHINCTER ANI;
9, INTERNAL SPHINCTER ANI

DEEP PERINEAL POUCH

- 12. Cut this Deep Fascia along its attachment to the Pubic rami and reflect it posteriorly in order to carry the dissection into the Deep Perineal Pouch.
- 13. Uncover and study the other structures contained in this space.

Transversus Perinei Profundus
Sphincter Urethrae Membranaceae
Glandulae Bulbo-urethrales (Cowper's)

Note: In females, the corresponding Glandulae Vestibulae are located in the Superficial Perineal Pouch.

- 14. Trace the Deep Fascia upon the Bulb of the Penis medially; and also identify its envelopment of the Crura.
- 15. More deeply, identify the Infra-anal Fascia lying upon the inferior surface of the Levator Ani muscle, and forming the superior wall of the Deep Perineal Pouch. Recognize it as a continuation of the Transversalis Fascia of the Pelvis which splits to cover both upper and lower surfaces of that muscle.
- 16. Observe that the two layers of Fascia, Deep and Transversalis, stretch between the Pubic bones and fuse anteriorly. With the inclusion of the intervening muscles, they form the Transverse or Triangular Ligament of the Pelvis.
- 17. Study the continuity of fascial planes of the Urogenital and Pelvic Diaphragms according to the cross sections; also the passage of the Urethral Canal through both Diaphragms.

ANAL TRIANGLE

- 18. Remove Camper's Fascia from the area of the Anal Triangle, noting how it fills the Ischiorectal Fossa on each side of the Rectum.
- 19. Try to trace the posterior continuation of Colles' Fascia from the Urogenital Triangle to form the lining of the Fossae.
- 20. Identify the Anococcygeal Ligament, and complete the dissection of the Sphincter Ani Externus muscle.
- 21. Study the entire extent of the Pelvic Diaphragm.
- 22. Try to locate within the Pelvis the Arcus Tendineus of the Pelvic Fascia (Transversalis). Along this line the Transversalis Fascia splits into three divisions to cover both sides of the Levator Ani and the medial side of the Obturator Internus.
- 23. Study the muscles forming the Pelvic Floor also the Coccigeus and Obturator internus. Locate the Sacrotuberous Ligament.
- 24. Review the bones of the Pelvis.

Describe the following muscles:

- SPHINCTER ANI EXTERNUS.....
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ISCHIOCAVERNOSUS.....
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BULBOCAVERNOSUS.....
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.....

TRANSVERSUS PERINEI SUPERFICIALIS.....
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TRANSVERSUS PERINEI PROFUNDUS.....
.....
.....
.....
.....

SPHINCTER URETHRAE MEMBRANACEAE.....
.....
.....
.....
.....

LEVATOR ANI.....
.....
.....
.....
.....

SPHINCTER ANI INTERNUS......
.....
.....

COCCYGEUS......
.....
.....

OBTURATOR INTERNUS......
.....
.....

GLANDULAE BULBO-URETHRALES (COWPERI) AND DUCTS

GLANDULAE VESTIBULARES (BARTHOLINI)

X X I I I
INTRAPELVIC STRUCTURES

A. TOPICS FOR DISCUSSION. Peritoneal Reflections in the Pelvis. Topography of the Pelvic Organs.

B. SPECIAL STUDY

Fasciae: Peritoneum, Endopelvina (Transversalis)

Viscera: Ureter, Vesical urinaria, Urethra, Colon (Pelvic), Rectum

Male:

Penis

Testes

Prostata

Vesiculae seminales

Ductus deferentes

Glandulae bulbo-urethrales

(Cowper's)

Female:

Vagina

Uterus

Tuba uterina

Ovaria

Glandulae vestibulares

(Bartholini)

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Study the distribution of the Peritoneum on the Bladder, the upper and middle thirds of the Rectum (the lower third having no contact), and other pelvic structures.
- 2. Identify the False Ligaments of the Bladder and briefly describe.
 - a. Middle Umbilical Fold
 -
 - b. Lateral Umbilical Folds
 -
 - c. Lateral False Ligaments
 -
 - d. Posterior False Ligaments
 -
- 3. Identify the Sacrogenital Fold and the Rectovesical Pouch.
- 4. Remove the Peritoneum from the visceral surface of the organs and study the underlying Transversalis Fascia, Fascia Endopelvina.

5. Locate and define the Cavum Retzii.....
.....
.....
Urachus.....
.....
Lateral Pubovesical Ligament.....
.....
What are the Pubovesical and Rectovesical muscles?

RECTUM

6. Remove the Rectum by a circular cut around the Anus, and wash.
7. Expose its external longitudinal muscle fibers identifying them as continuations of the three Taeniae of the Pelvic colon.
8. Slit the Rectal wall and identify the Transverse Rectal Folds (Houston's Valves), Ampulla, Columns of Morgagni, and Anal Valves.
9. Study the muscular layers noting the relation of the circular fibers to the Internal Sphincter muscle.
10. Complete the description of the Rectum on page 96.

GENITO-URINARY STRUCTURES: MALE

11. Uncover the Seminal Vesicles, Prostate and Ductus Deferens. Observe the relations of the Ductus Deferens to the Vesicles and Ureters, and follow its course to the Internal Inguinal Ring.
12. Expose the pelvic portion of the Ureters and note their relation to the pelvic wall, and large blood vessels.
13. Study the relationship of the Prostate to the Perineum and Bladder, also to the position previously occupied by the Rectum.

PENIS

14. Incise the skin in midline on the under surface of the Penis and reflect laterally. Note the extreme looseness of Superficial Fascia.
15. Similarly remove the Superficial Fascia and identify the Corpora Cavernosa Penis and Corpus Cavernosum Urethrae.
16. Liberate the distal ends of the Corpora Cavernosa Penis from the Glans Penis and continue the separation throughout the length of the organ. Identify the Bulb and its position to the Pelvic floor.

- 17. By carefully separating and cutting all pelvic attachments, except that of the Crura to the pubic bones, remove en masse the Bladder, Prostate, Ductus Deferentes, Ureters, Kidneys and Corpus Cavernosum Urethrae from the body.
- 18. Study and make a sketch of the relationships of the Ureters, Ducts, Prostate and Vesicles to the inferior and posterior walls of the Bladder.
- 19. Dissect a small area of the wall of the Bladder, identifying its different muscular layers.
- 20. From the Urethral orifice of the Glans, split the upper wall of the Urethral Canal its entire length continuing through the Prostate upon the anterior and superior surface of the Bladder.
- 21. Invert the Bladder wall, and identify the Trigonum Vesicae (Lieautaud), the Uvula Vesicae, and the position of the openings of the Urethra and Ureters.
- 22. Identify the different portions of the Urethra.
- 23. Separate the cut edges of the Canal and identify in the Prostatic portion the Colliculus Seminalis, the openings of the Ejaculatory Duct and the Crista Urethralis.
- 24. Identify the Prostatic Utricle and state its significance.
- 25. Locate in the Cavernous portion of the Penis:
 - Fossa navicularis urethrae
 - Lacuna magna
 - Lacunae urethrales
 - Glandulae urethrales
- 26. List the structures opening into the male Urethra, and give the location of their urethral orifices:
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- 27. Make cross-section cuts of the Corpora Cavernosa Penis and of the Corpus Cavernosum Urethrae to study their internal structure; also of the Prostate, the Seminal Vesicle, and Ampulla of the Ductus Deferens.

28. Section the Testes, one vertically, the other horizontally. Identify and study the following:

Epididymis testis
Canalis epididymis
Septum testis
Mediastinum testis
Canalliculi seminalis

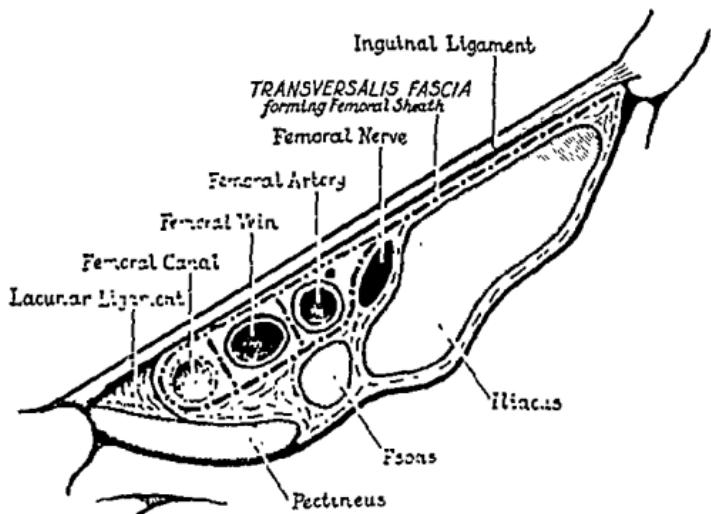
BLADDER AND URETERS

PROSTATE

PENIS

TESTES AND DUCTUS DEFERENTES

VESICULAR SEMINALES AND DUCTUS EJACULATORII



DIAGRAMMATIC SKETCH SHOWING THE COMPOSITION OF THE FEMORAL SHEATH
FROM PROLONGATIONS OF TRANSVERSALIS FASCIA (— · — · —) EXTENDING BE-
NEATH THE INGUINAL LIGAMENT

FEMORAL CANAL AND INTRAPELVIC MUSCLES

A. TOPICS FOR DISCUSSION. Femoral Sheath and Canal. Femoral Hernia.

B. SPECIAL STUDY

Canalis femoralis
 Annulus femoralis
 Fovea lata
 Fascia lata
 Ligamentum lacunare

*Bones: Femur**Muscles:*

Levator Ani
 Coccygeus
 Piriformis
 Obturator internus
 Psoas major
 Psoas minor
 Iliacus

Innervation:

Sacralis 4 and N. Pudendus
 Sacrales 4,5
 Sacrales 1,2
 Sacrales 1,2,3
 Lumbales 2,3
 Lumbalis 1
 Lumbales 2,3 (Femoralis)

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Mark a line diagonally across the anterior aspect of the thigh three inches below, and parallel to, the Inguinal Ligament. Reflect only the skin to that line making the necessary skin incisions at the medial and lateral extremities.
- 2. Dissect away Camper's Fascia from this area identifying and preserving the exposed portion of the Great Saphenous Vein emerging from the Fossa Ovalis.
- 3. Reflect downward Scarpa's Fascia, identifying that portion covering the Fossa Ovalis as the Fascia Cribrosa (sieve-like), because of its perforations by blood and lymph vessels.
- 4. The Fossa Ovalis is formed by the Fascia Lata or Deep Fascia of the thigh. Cleanly expose the Falciform Margin, identifying the spiral arrangement of the Superior and Inferior Cornu.
- 5. On a skeleton observe the shape and size of the space between the Inguinal ligament and the anterior border of the Pelvis.
- 6. Within the Pelvis trace the External Iliac vessels to their point of exit beneath the Inguinal ligament.
- 7. Similarly locate and trace the Femoral nerve beneath the Transversalis Fascia covering the Iliac and Psoas muscles.

- 8. Locate the Lacunar Ligament (Gimbernat's) in the angle formed by the Inguinal ligament and the superior Pubic ramus; also identify the "Femoral Ring" located between the free border of the Lacunar ligament and the Femoral Vein.
- 9. In the accompanying diagram observe that the plane of Transversalis Fascia covering the Iliac and Psoas muscles is continued into the thigh, and divides the space beneath the Inguinal ligament into two parts:
 - a. Postero-lateral, **Lacuna Musculorum**, containing the muscles and Femoral nerve.
 - b. Antero-medial, **Lacuna Vasorum**, containing the blood vessels and Femoral Canal.

FEMORAL SHEATH

- 10. This structure is a flattened pocket-like extension of the Abdominal Transversalis Fascia continued beneath the Inguinal Ligament for a short distance into the thigh.
Anterior Wall. An extension of the Transversalis Fascia from the anterior abdominal wall, continued in front of the blood vessels.
Posterior Wall. The portion of the Transversalis Fascia (Ilio-pectineal) covering the Iliacus and Psoas muscles and extended medially to cover the Pectenius; it lies behind the Femoral vessels.
 Note: the Femoral nerve is lateral to, and outside of, the "Sheath."
- 11. Lateral to the Femoral Artery, the anterior and posterior walls fuse; medially they also fuse and dip into the space between the Lacunar ligament and the Femoral Vein to form the medial wall of the Femoral Canal.
- 12. Two Septa divide the Femoral Sheath into three compartments:
 Lateral, enclosing the Femoral Artery (also the Lumbo-inguinal Nerve);
 Middle, enclosing the Femoral Vein;
 Medial, comprising the Femoral Canal.
- 1. The two compartments which contain the Artery and Vein, are about one and one half inches in length. They terminate distally by fusion of their fascial walls with the Adventitia (external coat) of these vessels.

FEMORAL CANAL

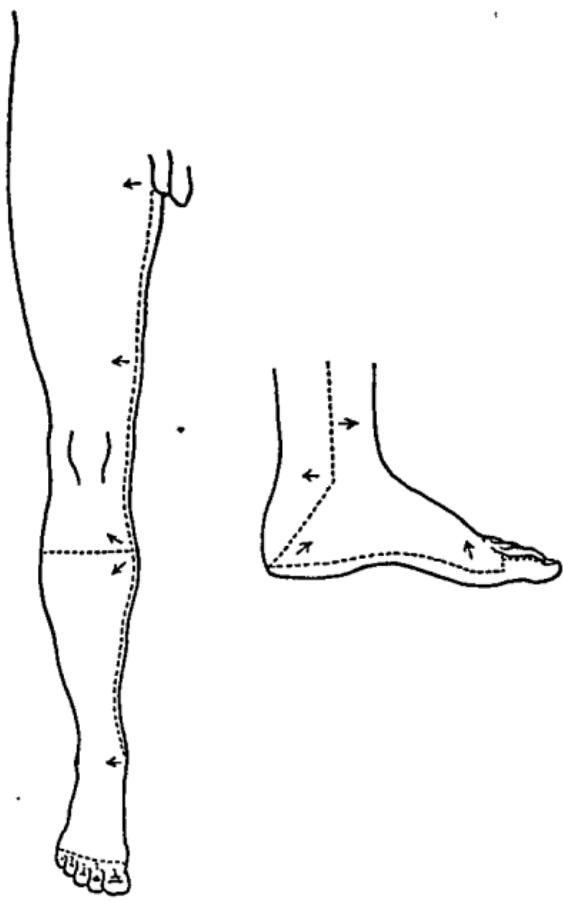
- 14. The medial compartment is a small sac of about a half-inch in length, extending to the Fossa Ovalis externally. It contains a lymph gland (Rosenmüller), and firm connective tissue. This is the site of Femoral Herniae—most common in women.
- 15. Study the position of the Canal internally and externally. Push a probe from within the pelvis into the Femoral Canal to observe its proximity to the Fossa Ovalis.

- 16. Within the Pelvis review, then remove, the Levator ani muscle.
- 17. Trace the pelvic course of the Common Iliac, External Iliac, and Hypogastric arteries; also their associated veins.
- 18. Identify the Plexus Sacralis and its position.
- 19. Review the Psoas Major and Minor muscles; also the Quadratus lumborum.
- 20. Isolate and study the Pelvic portion of the Iliacus.
- 21. Displace the vessels and nerves to study the intrapelvic portions of the Piriformis and Obturator Internus muscles.
- 22. Identify the extent of the Coccygeus; it is sometimes absent, being represented in the Sacrospinous ligament which ordinarily underlies this muscle.

Describe the Femur. (Page 237.)

Study and describe the following joints (page 259):

Sacro-iliac
Symphysis Pubis
Hip



X X V
A N T E R I O R T H I G H

A. TOPICS FOR DISCUSSION. Mechanics of Hip Joint. Nelaton's Line. Bryant's Triangle.

B. SPECIAL STUDY

Bones: Os Coxae, Femur, Patella

Joint: Articulatio coxae

Fasciae: Lata

Tractus iliotibialis

Septa intermuscularia

Muscles:

Sartorius

Tensor Fasciae latae*

Rectus femoris

Vastus medialis

Vastus intermedius

Vastus lateralis

Pectenius

Gracilis

Adductor longus

Adductor brevis

Adductor magnus

Innervation:

Femoralis

Gluteus superior

Femoralis

Femoralis

Femoralis

Femoralis

Femoralis † Obt. Acc.

Obturatorius

Obturatorius

Obturatorius

Obturatorius

* Belongs to the Gluteal group.

† Sometimes by N. Obturatorius.

Triangle: Trigonum femorale (Scarpa's)

Canal: Canalis adductorius (Hunter's)

C. VARIATIONS TO BE LOOKED FOR

Adductor minimus: the superior and anterior portion of a segmented Adductor Magnus.

D. DIRECTIONS FOR DISSECTION AND STUDY

- 1. a. Carry an incision of skin and superficial fascia down the medial side of the thigh to about three inches below the knee.
b. Make an incision transversely across the anterior surface of the leg at that level.
- 2. Reflect the skin and superficial fascia laterally exposing the Fascia Lata sufficiently to observe its thickened Iliotibial Tract on the lateral aspect of the thigh.

3. Identify the location of the Sartorius muscle and split the overlying Fascia Lata. Reflect the fascia to expose the muscle throughout its length. Carry the dissection of this muscle downward to separate its fibers of insertion from the Gracilis tendon.

FEMORAL TRIANGLE (SCARPA'S)

4. From the medial side of the thigh, reflect the Fascia lata to identify the borders and contents of the triangle formed superiorly, by the Inguinal Ligament; laterally, by the inner border of the Sartorius; and medially, by the medial border of the Adductor longus.

Roof: Fascia lata, including the Fossa Ovalis

Floor: Iliopsoas, Pectenius and Adductor longus

Contents: Femoral vessels and nerve with their proximal branches. These vessels are continued into the Adductor Canal with a branch of the Femoral Nerve.

ABDUCTOR CANAL (HUNTER'S)

- 5. It extends through the middle third of the thigh under the Sartorius muscle. Isolate and displace the Sartorius to expose the underlying fascia, a deeper extension of the Fascia Lata, which forms the roof of the Canal. Expose and identify the Femoral vessels and Saphenous Nerve contained in it.
 - 6. Identify its antero-lateral wall as the Vastus Medialis; and the posterior wall as the Adductor Longus proximally, and Adductor Magnus distally.
 - 7. Locate the four parts of the Extensor Quadriceps Femoris;

Rectus femoris	Vastus intermedius
Vastus medialis	Vastus lateralis
 - 8. Remove the Fascia Lata covering these muscles as far as the anterior margin of the Iliotibial Tract and Tensor Fasciae Latae muscle. Isolate the belly of the Rectus Femoris. In order to expose its acetabular head, separate the Sartorius and Tensor Fasciae Latae with the thigh flexed upon the body.
 - 9. With the thigh still flexed, isolate the belly of the Vastus Intermedius. Continue dissection to expose the closely attached Vastus Medialis.
 - 10. Cut along the posterior border of the Iliotibial Tract. Separate this fascial band from the underlying Vastus Lateralis and proceed with the isolation of that muscle. It is easily separable from the Intermedius.
 - 11. Place the leg in extension and abduction. Identify the extent of the Medial Intermuscular Septum which lies between the Vastus Medialis and the Adductor muscles; also, its attachment upon the inner lip of the Linea Aspera on the Femur. It is a deep extension of the Fascia Lata. Locate the Lateral Intermuscular Septum.

- 12. Identify and isolate the Gracilis muscle, separating its tendon of insertion from that of the Semitendinosus.
- 13. Isolate the Adductor Longus, and remove the Fascia Ilio-pectinea from the Pectineus muscle.
- 14. Identify the portion of the Adductor Brevis visible between the Adductor Longus and Pectineus.
- 15. Flex the thigh to relax the dissected muscles and expose the Adductor Magnus. Note if the upper fibers form a separate muscle to present an Adductor Minimus.
- 16. At the lower part of the insertion of the Adductor Magnus observe the opening through the tendon, Hiatus Tendineus Adductorius, and the passage of the Femoral vessels to the Popliteal Fossa. The hiatus is located at the juncture of the middle and lower thirds of the thigh.
- 17. Study carefully the individual action of the foregoing muscles upon the hip and kneejoints.

Describe the Patella, Tibia and Fibula. (Pages 237-239.)

Study and describe the Knee and Superior Tibio-fibular joints. (Page 261.)

SARTORIUS

Joints.....	.....
Position.....	.....
Action.....	.....
.....
Origin.....	.....
Insertion.....	.....
Nerve Supply.....	from.....

QUADRICEPS FEMORIS**Rectus Femoris**

Joint .. .	.....
Position.....	.....
Action. ....	.....
Vasti	
Joint.....	.....
Position .. .	.....
Action. ....	.....
Origins.....	.....
Rectus Femoris	.....
Vastus Medialis ..	.....
Vastus Intermedius	.....
Vastus Lateralis..	.....
Insertion.....	.....
Nerve Supply.....	from.....

PECTINEUS

Joint. ....	.....
Position.....	.....
Action.....	.....
Origin .. .	.....
Insertion..	.....
Nerve Supply.....	from.....

ANTERIOR THIGH

GRACILIS

Joints.....
Position.....
Action.....
Origin.....
Insertion..... from.....
Nerve Supply.....

ADUCTOR LONGUS

Joint.....
Position.....
Action.....
Origin.....
Insertion..... from.....
Nerve Supply.....

ADUCTOR BREVIS

Joint.....
Position.....
Action.....
Origin.....
Insertion..... from.....
Nerve Supply.....

ADUCTOR MAGNUS

Joint.....
Position.....
Action.....
Origin.....
Insertion..... from.....
Nerve Supply.....



X X V I
GLUTEAL REGION

A. TOPICS FOR DISCUSSION. Erect Posture. Bipedal Locomotion.

B. SPECIAL STUDY

Muscles:

Gluteus maximus	Gluteus inferior
Gluteus medius	Gluteus superior
Gluteus minimus	Gluteus superior
Piriformis	S(1),2
Gemellus, superior	L ₅ , S _{1,2}
Gemellus, inferior	L _{4,5} S ₁
Obturator internus	L ₅ , S _{1,2}
Quadratus femorus	L _{4,5} S ₁

Innervation:

Ligaments: Sacrotuberous
Sacrospinous

Fasciae: Glutea, Tractus iliotibialis

Bursa: Ischiadica musculi glutei maximi

C. VARIATIONS TO BE LOOKED FOR

Ischio-femoralis: from the Ischial tuberosity to the Femur along the lower border of the Gluteus Maximus.

D. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Turn cadaver face downward. Remove the skin and superficial fascia from the posterior surface of the thigh.
- 2. Note the posterior continuation of Fascia Lata into the Fascia Glutea. It is thin over the Gluteus Maximus and sends numerous small septa deeply between the coarse fiber bundles of that muscle.
- 3. Uncover the Gluteus Maximus muscle noticing the fibers which originate from the Fascia Lumbodorsalis, and the insertion of fibers into the Fascia Lata of the posterior thigh.
- 4. Lift the posterior-inferior border of the muscle and isolate it from the Sacro-tuberous Ligament. Cut the muscle close to its origin and reflect downward identifying the Bursa Ischiadica Musculi Glutei Maximi between the muscle and the tuberosity of the Ischium.
- 5. Uncover the Gluteus Medius, noting the origin of its most superficial fibers from overlying fascia. Retain this Gluteal Fascia with the muscle.

- 6. With the thigh abducted, cut from behind forward, the Gluteus medius from its iliac origin and expose the **Gluteus Minimus**.
- 7. Note the union of the two muscles along their anterior borders, so that they may be regarded as forming between them a pouch which opens posteriorly.
- 8. Reflect the Gluteus Medius downward to isolate and study the **Gluteus Minimus**.
- 9. Rotate the thigh inward to facilitate the following dissection. Identify and uncover the extrapelvic portion and insertion of the **Piriformis** muscle.
- 10. Identify the **Great Sciatic Nerve** and note its relation to the **Piriformis**, the **Obturator Internus**, **Gemelli**, and **Quadratus Femoris** muscles.
- 11. Expose cleanly and isolate the extrapelvic portion of the **Obturator Internus**, the two **Gemelli** muscles, and the **Quadratus Femoris**.
- 12. On the antero-lateral side of the thigh, lift the thick fascial covering of the **Tensor Fasciae Latae**. Observe the continuation of its fibers into the **Fascia Lata**.
- 13. Review the entire extent of the **Ilio-tibial Tract**. Note that it curves anteriorly to include the **Tensor Fasciae Latae** and posteriorly to include the fascial insertion of the **Gluteus Maximus**.
- 14. Review the intra and extrapelvic portions of the **Piriformis** and **Obturator Internus** muscles.
- 15. Study the positions of the **Sacrotuberous** and **Sacrospinous Ligaments** as viewed from within and outside of the **Pelvis**. Identify their positions on a skeleton.
- 16. Make a sketch showing the formation of the **Major** and **Minor Sciatic Foramina**, and the structures passing through each.
- 17. Study the individual action of the foregoing muscles upon the hip joint in extended and flexed positions.

• GLUTEUS MAXIMUS

Joint.....
Position.....
Action.....
Origin.....
.....
Insertion.....
Nerve Supply... from..

GLUTEUS MEDIUS

Joint.....
Position...
Action....
Origin...
Insertion..
Nerve Supply... from..

GLUTEUS MINIMUS

Joint.....
Position..
Action....
Origin...
Insertion..
Nerve Supply... from..

TENSOR FASCIAE LATAE

.....
.....
.....

PIRIFORMIS

Joint.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....

GEMELLI, SUPERIOR AND INFERIOR

Joint.....
Position.....
Action.....
Origins
 G. Superior.....
 G. Inferior.....
Insertion.....
Nerve Supply..... from.....

QUADRATUS FEMORIS

Joint.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....

OBTURATOR INTERNUS (Page 122.)

HIP COMPLETED AND POSTERIOR THIGH

A. TOPICS FOR DISCUSSION. Clinical Considerations.

B. SPECIAL STUDY

Joint: Articulatio Coxae*Fasciae:* Membrana obturatoria, Septa intermuscularia*Muscles:*

Obturator externus
Psoas major
Psoas minor
Iliacus
Biceps femoris
Semitendinosus
Semimembranosus

Innervation:

Obturatorius
Lumbales (1) 2,3 (4)
Lumbales 1,2
Femorales
Ischiadicus
Ischiadicus
Ischiadicus

Bursa: Iliopectinea, Iliacasubtendinea, Suprapatellaris, Prepatellaris*Foramen:* Obturatorium, Ischiadicum majus, Ischiadicum minus

C. VARIATIONS TO BE LOOKED FOR

Iliacus Minor: from the posterior superior spine of the Ilium to the anterior Intertrochanteric line of the Femur.

D. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Complete the removal of Deep Fascia from the posterior aspect of the thigh as far as the Femoral Condyles.
- 2. Cut the Quadratus Femoris in the middle and reflect to identify the Obturator Externus. Expose its point of insertion.
- 3. Continue the dissection distally to expose the posterior portions of the Adductor Magnus (and Minimus).
- 4. Cut the Adductor muscle along the upper three inches of its origin. Identify the insertion of the Psoas and Iliac muscles.
- 5. Isolate the long head of the Biceps Femoris. Identify and isolate the short head of the Biceps Femoris.
- 6. Identify the Lateral Intermuscular Septum between the Biceps and the Vastus Lateralis.
- 7. Trace the Septum to its attachment along the lateral lip of the Linea Aspera Femoris.

- 8. Lift the Semitendinosus from its groove in the Semimembranosus and isolate to its insertion on the medial aspect of the Tibia. Observe that the Semimembranosus is almost completely covered by the Semitendinosus in its lower medial portion.
- 9. Identify the Pes Anserinus (Goose Foot) formed by the tendons of the three muscles, Sartorius, Gracilis and Semitendinosus muscles.
- 10. Isolate the Semimembranosus and identify the Posterior Intermuscular Septum lying between it and the Adductor Magnus. It is the thinnest of the three septa.
- 11. Trace the course of the Sciatic Nerve in relation to the Adductor Magnus and the flexor muscles.
- 12. Turn the cadaver face up. Complete the isolation of the Iliopsoas muscle identifying the Bursa Iliacasubtendinea between the tendon and Femur, as the muscle is traced to its insertion. The Inguinal Ligament may be cut and the blood vessels displaced to improve the exposure.
- 13. Cut the Pectineus near its insertion and lift to identify the Bursa Iliopectinea between this muscle and the Os Pubis.
- 14. Expose the Obturator Externus anteriorly and trace its course to its insertion.
- 15. Compare the relationship and actions of the Obturator Internus and Externus.
- 16. Reflect a portion of the origin of the Obturator Externus to study the Obturator Membrane. Within the Pelvis, locate the tendinous arch in the Obturator Internus forming the Obturator Canal. Identify the Obturator vessels and nerve.
- 17. Above the Knee, lift the Vasti and Rectus muscles to identify the Suprapatellar Bursa. Observe its extent and locate its communication with the joint cavity.
- 18. Locate beneath the Vastus Intermedius the Articularis Genu muscle, tracing its fibers into the synovial membrane of the knee joint.
- 19. Draw cross-section sketches of the thigh at the juncture of the two upper quarters, and of the two lower quarters.
- 20. Review the actions of all muscles bridging the hip joint; also the thigh muscles which bridge the knee.

Analyse muscle action on the hip in—

Kicking a football; jumping; pitching a baseball.

OBTURATOR EXTERNUS

Joint.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....

PSOAS MAJOR

Joints.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....

PSOAS MINOR

.....
.....

ILIACUS

Joint.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....

SEMITENDINOSUS

Joints.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....

SEMIMEMBRANOSUS

Joints.....	.....
Position.....	.....
Action.....	.....
Origin.....	.....
Insertion.....	.....
Nerve Supply.....	from.....

BICEPS FEMORIS**Long head**

Joints.....	.....
Position.....	.....
Action.....	.....
Origin.....	.....
Insertion.....	.....
Nerve Supply.....	from.....

Short head

Joint.....	.....
Position.....	.....
Action.....	.....
Origin.....	.....
Insertion.....	.....
Nerve Supply.....	from.....

X X V I I I

POPLITEAL SPACE AND POSTERIOR LEG

A. TOPICS FOR DISCUSSION. Mechanism of the Knee Joint.

B. SPECIAL STUDY

Bones: Tibia, Fibula, Patella

Joints: Genu; Tibio-fibularis; Syndesmosis tibio-fibularis

Fasciae: Cruris, Ligamentum laciniatum, Retinaculum peroneorum superius

Muscles:

Gastrocnemius
Soleus
Plantaris
Popliteus
Flexor digitorum longus
Flexor hallucis longus
Tibialis posterior

Innervation:

Tibialis
Tibialis
Tibialis
Tibialis
Tibialis
Tibialis
Tibialis

Fossa: Poplitea

Bursa: Bicepititis femoris, Anserina, Capitis gastrocnemialis, medialis and lateralis,
Tendinitis calcanei

C. VARIATIONS TO BE LOOKED FOR

Gastrocnemius, Third head: arising from the popliteal surface of the Femur.

Flexor Digitorum Longus Accessorius: from either the Tibia or Fibula and inserting into the tendon of the long flexor or Quadratus Plantae.

Peroneotibialis: between the Tibia and Fibula immediately beneath the proximal articulation of these bones.

D. DIRECTIONS FOR DISSECTION AND STUDY

- 1. a. Continue a longitudinal incision of skin and superficial fascia down the medial side of the leg to the Internal Malleolus. (Page 132.)
b. Make an oblique circular incision around the ankle to the tip of the heel.
- 2. Dissect the skin and superficial fascia from the posterior and lateral surfaces of the leg and heel to uncover the Crural Fascia.
- 3. Note its distal thickenings to form the Lacinate Ligament and the Superior Peroneal Retinaculum covering the tendons behind the Medial and Lateral Malleoli.

POPLITEAL FOSSA

4. Identify and expose cleanly the muscles forming the boundaries of the Popliteal Fossa, and identify its contents.

Superior: medial side; Semimembranosus and Semitendinosus.
lateral side; Biceps femoris.

Inferior: medial side; Gastrocnemius.
lateral side; Gastrocnemius and Plantaris.

Floor: Popliteus, Arcuate and Oblique Ligaments.
Surface of the Femur and Tibia.

Contents: Fat, Popliteal Artery and Vein, and the Tibial and Peroneal Nerves.

5. Expose and isolate the two heads and belly of the Gastrocnemius. Locate the Bursa beneath each head.
6. Identify and isolate the Plantaris Muscle, tracing the course of its tendon.
7. Try to identify the Bursa under the tendon of the Biceps Femoris; also the Bursa Anserina common to the Tendons of the Gracilis, Sartorius, and Semitendinosus muscles.
8. Cut the medial head of the Gastrocnemius (without dividing the Plantaris Tendon), and isolate the Soleus muscle with the Tendo-Achilles. Identify the Bursa Tendinis Calcanea.
9. Locate the Arcus Tendineus of the Soleus. Note the passage of the Popliteal Artery and Vein, and the Tibial Nerve.
10. Identify the deep layer of Crural Fascia, Pars Profunda, lying between the Soleus and deep flexor muscles.
11. Cut the tibial origin of the Soleus and reflect it laterally with the Gastrocnemius. The two heads of the latter with the Soleus can be regarded as a "Triceps Surae."
12. Expose and isolate the Popliteus muscle.
13. Identify and isolate the belly of the Flexor Digitorum Longus.
14. Identify and isolate the belly of the Flexor Hallucis Longus.
15. Separate the bellies of the previous muscles to locate the Tibialis Posterior. Isolate its belly in order to expose a portion of the Membrana Interossea dorsally.
16. Review the actions of all the muscles bridging the knee joint.

Describe the Talus, Calcaneum and Navicula (page 239-241), also the Tibiofibular Syndesmosis and Ankle (page 261).

POPLITEAL SPACE AND POSTERIOR LEG 149

GASTROCNEMIUS

Joints.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....

SOLEUS

Joints.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply..... from.....

PLANTARIS

.....
.....
.....
.....
.....

POPLITEUS

.....
.....
.....
.....
.....

FLEXOR DIGITORUM LONGUS

Joints.....
Position.....
Action.....
.....
Origin.....
Insertion.....
Nerve Supply..... from.....

I 50 POPLITEAL SPACE AND POSTERIOR LEG

FLEXOR HALLUCIS LONGUS

Joints.....	.....
Position .. .	.....
Action. . . . .	.....
.....
Origin.....	.....
Insertion. . . . .	.....
Nerve Supply.	from.....

TIBIALIS POSTERIOR

Joints.....	.....
Position.....	.....
Action. . . . .	.....
.....
Origin.....	.....
Insertion. . . . .	.....
Nerve Supply.	from.....

ANTERIOR LEG AND DORSUM OF FOOT

A. TOPICS FOR DISCUSSION: Movements of Ankle and Foot.

B. SPECIAL STUDY

Bones: Tarsus, Metatarsalia, and Phalanges

Joints: Talo-cruralis (ankle); Talo-calcanea (Infra-talar); Talo-navicularis, Talo-calcaneo-navicularis; Calcaneo-cuboidea

Muscles:

Tibialis anterior
Extensor digitorum longus
Peroneus tertius
Extensor hallucis longus
Extensor digitorum brevis
Peroneus longus
Peroneus brevis

Innervation:

Peroneus profundus
Peroneus profundus
Peroneus profundus
Peroneus profundus
Peroneus profundus
Peroneus superficialis
Peroneus superficialis

Ligaments: Patellae, Transversum cruris (Annular Ligament), Cruciatum, Retinaculum peroneorum inferius, Septa intermuscularia

C. VARIATIONS TO BE LOOKED FOR

Peroneus Quartus: arising from the lower part of the Fibula, and inserting on the Calcaneum or Cuboid.

Peroneus Quintus: arising from the Fibula or one of the peroneal muscles and inserting upon the fifth digit.

D. DIRECTIONS FOR DISSECTION AND STUDY

Turn cadaver face up.

- 1. a. Make longitudinal incisions of the skin and superficial fascia from each side of the heel to the tip of the first and fifth digits. (Page 132.)
b. Complete removal of skin and superficial fascia from the leg and dorsum of the foot.
- 2. At the ankle identify the Transverse Crural Ligament (Annular Ligament) as a thickening of the Fascia Cruris; also the Y-shaped Cruciate Ligament, noting the bony attachments of the latter.
- 3. Cut along the margins of these Ligaments to retain them in position during removal of Crural Fascia.
- 4. Cleanly expose the Patellar Ligament and identify its attachment to the Tibial Tubericle.

152 ANTERIOR LEG AND DORSUM OF FOOT

- 5. Cut the Crural Fascia along the tibial crest and reflect laterally; isolate the belly of the Tibialis Anterior.
- 6. Note the Anterior Intermuscular Septum extending deeply between the Extensor Digitorum Longus, and the adjacent Peroneus Longus.
- 7. Isolate the belly of the Extensor Digitorum Longus.
- 8. Isolate the belly of the Extensor Hallucis Longus.
- 9. Locate the Membrana Interossea ventrally.
- 10. Identify and isolate the belly of the Peroneus Tertius.
- 11. Identify the Posterior Intermuscular Septum between the Peroneus Longus and Soleus muscles.
- 12. Expose and isolate the bellies of the Peroneus Longus and Brevis.
- 13. Trace the course of the Peroneus Longus and Brevis, to the lateral border of the foot noting their position to each other above, behind, and below the Malleolus. The Superior and Inferior Retinacula may be cut to do this.
- 14. Identify the three compartments under the Cruciate Ligament for the passage of the tendons of:
 - a. Tibialis Anterior
 - b. Extensor Hallucis Longus
 - c. Extensor Digitorum and Peroneus Tertius
- 15. Note if the Tibialis Anterior has a divided tendon.
- 16. Slit the compartments to lift the tendons aside and isolate the Extensor Digitorum Brevis. What digits receive its tendons?
.....
- 17. Study all the muscles bridging the Ankle, especially in reference to Pronation and Supination of the foot.
- 18. Make sketches showing the position and extent of the Tendon Sheaths about the Ankle.
Describe the Cuneiform, Cuboid, Metatarsal and Phalangeal bones (page 241); also the joints between the Talus, Navicular, Calcaneum and Cuboid bones (page 263).

ANTERIOR LEG AND DORSUM OF FOOT

153

TIBIALIS ANTERIOR	
Joints.....	
Position.....	from.....
Action.....	
Origin.....	
Insertion.....	
Nerve Supply.....	

EXTENSOR DIGITORUM LONGUS

Joints.....	
Position.....	from.....
Action.....	
Origin.....	
Insertion.....	
Nerve Supply.....	

PERONEUS TERTIUS

Joints.....	
Position.....	from.....
Action.....	
Origin.....	
Insertion.....	
Nerve Supply.....	

EXTENSOR HALLUCIS LONGUS

Joints.....	
Position.....	from.....
Action.....	
Origin.....	
Insertion.....	
Nerve Supply.....	

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EXTENSOR DIGITORUM BREVIS

Joints.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply.....

PERONEUS LONGUS

Joints.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply.....

PERONEUS BREVIS

Joints.....
Position.....
Action.....
Origin.....
Insertion.....
Nerve Supply.....

TENDON SHEATHES

X X X
FOOT (PLANTAR REGION)

A. TOPICS FOR DISCUSSION. Functional Axis. Muscular Arrangement.

B. SPECIAL STUDY

Joints: Transversa tarsi (Chopart); Tarsometatarsa (Lisfranc); Intermetatarsa; Metatarsophalangea; Digitorum pedis

Muscles	Innervation
<i>First layer:</i>	
Flexor digitorum brevis	Plantaris medialis
Abductor hallucis	Plantaris medialis

<i>Second layer:</i>	
Quadratus plantae	Plantaris lateralis
Lumbrales	I, Plant. med.—II, III, IV, Pl. lat.
Tendons of Long Flexors	

<i>Third layer:</i>	
Adductor hallucis	Plantaris lateralis
Flexor hallucis brevis	Plantaris medialis
Flexor digiti quinti brevis	Plantaris lateralis

<i>Fourth layer:</i>	
Interossei plantares	Plantaris lateralis
Interossei dorsales	Plantaris lateralis

Ligaments: Aponeurosis plantaris, Plantare longum, Calcaneonaviculare, Calcaneocuboideum plantare

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Dissect the skin and superficial fascia from the plantar surface of the foot, noting the density of the fatty layer and extensions of tough fibrous tissue from skin to underlying Aponeurosis.
- 2. Study the Plantar Aponeurosis comparing the development of its medial and lateral portions.
- 3. Starting at the heel, lift the Aponeurosis forward. Observe the two raphe or septa which attach to the bones and separate the plantar portion of the foot into three longitudinal compartments—medial, middle and lateral. Also note the origin of superficial fibers of the underlying Flexor Digitorum Brevis from the deeper surface of the Aponeurosis.

FIRST LAYER OF MUSCLES

4. Isolate the Flexor Digitorum Brevis. Judging from its tendons, with what muscle of the hand does it correspond?
.....
5. Isolate the belly of the Abductor Hallucis.
6. Isolate the Abductor Digiti Quinti (V) and identify the portion regarded as the "Abductor ossis metatarsi quinti."
7. Cut the Flexor Digitorum Brevis near its origin, to expose the Quadratus Plantae and the Long Flexor and Posterior Tibial tendons. Observe that the principal blood vessels and nerves of the sole of the foot lie between the first and second layers of muscles.

SECOND LAYER

8. Isolate and study the Quadratus Plantae and the Lumbricales.
9. Divide the Abductor Hallucis near its origin and reflect it to expose the Lacinate Ligament covering the long Flexor tendons.
10. Trace the entire course of the Flexor Digitorum Longus through the foot.
11. Study also the course of the Flexor Hallucis Longus noting its position to the Sustentaculum Tali. Note if there is a union between its tendon and that of the Flexor Digitorum Longus.
12. Identify the three compartments in the Lacinate Ligament for the tendons of:
a. Tibialis Posterior
b. Flexor Digitorum Longus
c. Flexor Hallucis Longus
13. Divide the Quadratus Plantae and the Flexor tendon (digital) at a point opposite the Navicular Tubercle; also slit the compartment for the tendon of the Flexor Hallucis Longus to dislodge the latter.
14. Review the Tibialis Posterior and the extent of its insertion.

THIRD LAYER

15. Isolate the medial and lateral* heads of the Flexor Hallucis Brevis and trace to their respective unions with the Abductor Hallucis and Adductor Hallucis. The deeper fibers which insert upon the first metatarsal bone are regarded the "Opponens hallucis."
- *The lateral head may be considered as the Interosseous Plantaris I.
16. Locate the Sesamoid Bones contained in the tendons of these muscles and note their position to the head of Metatarsus I.

- 17. Isolate the Oblique and Transverse heads of the Adductor Hallucis.
- 18. Isolate the Flexor Digiti Quinti Brevis, identifying the deeper fibers attached to the shaft of the fifth metatarsal bone as the "Opponens digiti quinti."

FOURTH LAYER

- 19. Cut the oblique head of the Adductor Hallucis to dissect and study the Plantar and Dorsal Interosseous muscles. Identify their "centering" upon the *second* digit in the foot, whereas on the hand they center upon the *third* digit.
- 20. Expose the Long Plantar Ligament, and the Calcaneonavicular Ligament (Fibrocartilage) which supports the head of the Talus.
- 21. Cut the roof of the sheath of the Peroneus Longus tendon and the distal fibers of the Long Plantar Ligament to follow the course of the tendon across the sole of the foot to its insertion on the first Metatarsal bone.
Describe the joints formed by the Tarsus, Metatarsals and Phalanges. (Page 263.)

Review the actions of all the muscles of the hip, knee and ankle. Analyse various movements employed in sports.

FOOT (PLANTAR REGION)

159

ADDUCTOR HALLUCIS

Caput Transversum

Caput Obliquum

FLEXOR HALLUCIS BREVIS

Caput Mediale

Caput Laterale

FLEXOR DIGITI QUINTI BREVIS

INTEROSSEI PLANTARES

INTEROSSEI DORSALES

ARTICULATIO COXAE (Page 259.)

Ligaments: Iliofemorale (Y-Ligament)
Pubocapsulare
Ischiocapsulare
Labrum glenoidale
Transversum acetabuli
Teres femoris

- 11. The present exposure allows an excellent opportunity to study the positions and to analyze the actions of the Obturator Internus and Externus muscles upon the hip joint; also the course and action of the Iliopsoas.
- 12. After reviewing these muscles, isolate the Obturator muscles and cut their origins from the Obturator Membrana to study its character and extent.
- 13. Posterior Surface. Cleanly expose the Articular Capsule of the Hip Joint identifying the ligamentous thickening by fibers forming the Ischiocapsular Ligament. Identify their direction and areas of attachment.
- 14. Anterior Surface. Similarly expose the Iliofemoral and Pubocapsular Ligaments and study their direction and points of attachment. Note the thinner portions of the Capsule between the ligaments.
- 15. Study the static function of the Iliofemoral Ligament for a relaxed standing posture.
- 16. Open the joint by an oblique incision along the medial portion of the Iliofemoral Ligament, following the line of the femoral neck. Dislocate the head of the femur forward by:
 - a. Flexion of the thigh to 90°, then
 - b. Abduction with external rotation.
- 17. Examine the femoral head and the Lig. Teres.
- 18. Reverse the movements and reduce the dislocation.
- 19. Make a second incision across the first at right angles to it, in order to open the joint more freely. Study the following structures:

Labrum Glenoidale	Fovea Capitis Femoris
Lig. Transversum Acetabuli	Lig. Teres and attachments
Incisura Acetabuli	Synovial Membrane and cartilaginous surfaces
Acetabulum	Extent and attachments of Capsule

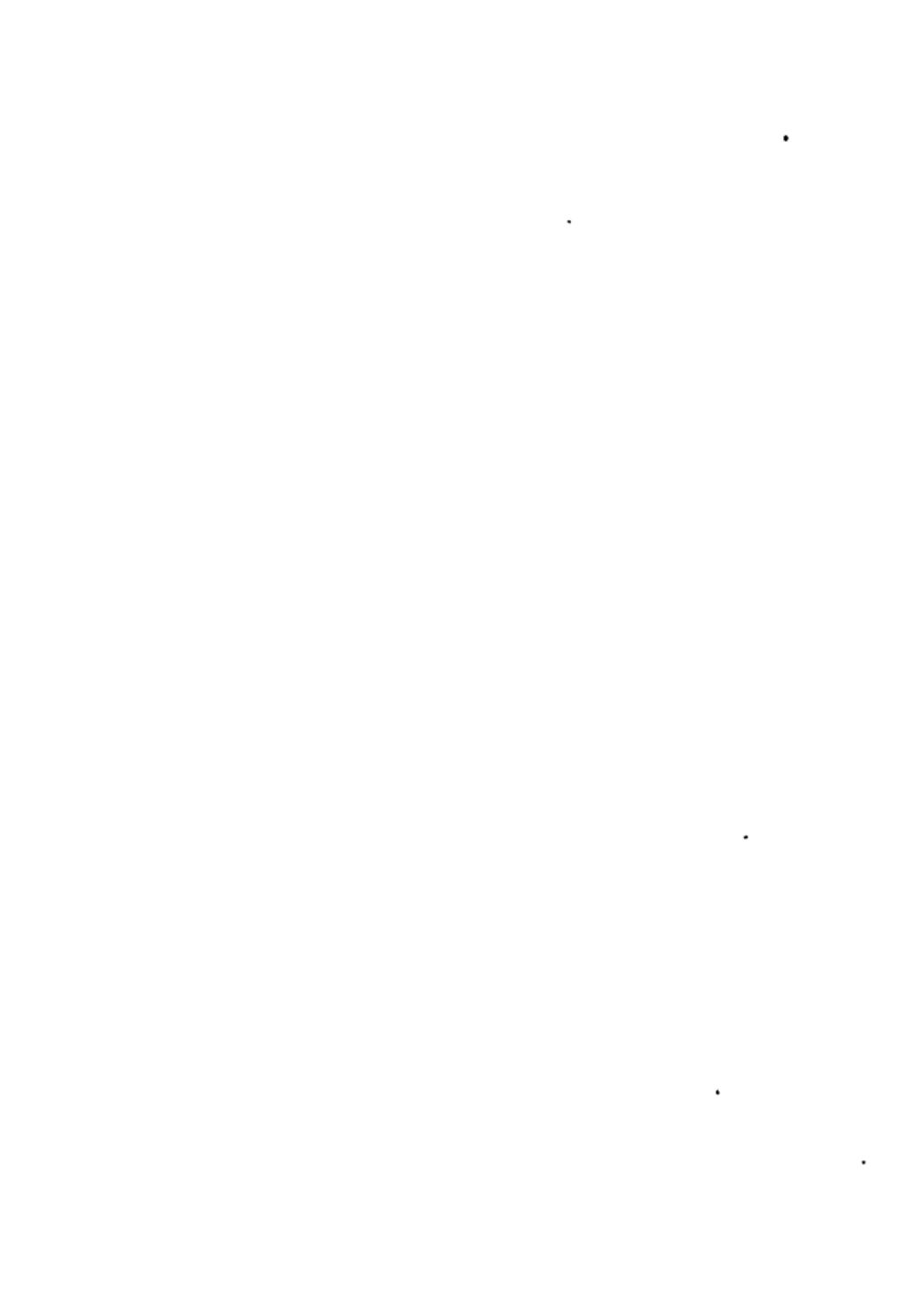
Make sketches of the Hip joint showing the arrangement of its Ligaments, and lines of attachment of its Capsule.

X X X I I
JOINTS OF LEG AND FOOT

ARTICULATIO GENU (Page 261.)

<i>Ligaments:</i>	Patellae	Popliteum obliquum
	Collaterale tibiale	Cruciatum anterius
	Collaterale fibulare	Cruciatum posterius
	Transversum genu	Coronaria

- 1. Cut the Gracilis, Sartorius, Semitendinosus, Biceps Femoris and Adductor Magnus, one inch from their insertions.
- 2. Cut the Semimembranosus just below the beginning of its tendon. Observe how its fibers contribute in the formation of the Oblique Popliteal and Tibial Collateral Ligaments.
- 3. Cut the heads of the Gastrocnemius and Plantaris near their origins.
- 4. Identify the thin portions of the joint Capsule located at the margins of the Fossa Poplitea below the condyles.
- 5. Identify the Oblique Popliteal Ligament and its fusion with the lateral fibers of the insertion of the Semimembranosus muscle.
- 6. Anteriorly cut the Quadriceps about four inches above its patellar insertion and reflect the lower part with care to trace the continuation of the underlying Suprapatellar Bursa with the knee joint.
- 7. Try to locate the following Bursa:
 - a. Bursa Musculi Gastrocnemii
 - b. Bursa Musculi Semimembranosi Lateralis
 - c. Bursa Musculi Poplitei
- 8. Identify the Retinacula Patellae and isolate them from the Capsule on each side of the knee.
- 9. Isolate the Patellar Ligament from the capsule.
- 10. Carefully lift the coarse Crural Fascia on each side of the knee to identify the fibers of the Tibial and Fibular Collateral Ligaments. Note their extent and points of attachment. Dissect up the Popliteus muscle to complete the exposure of the Fibular Collateral Ligament.
- 11. Locate and clearly expose the Arcuate Popliteal Ligament.
- 12. Identify and follow the margin of the Capsule above and below the joint. Open the joint Capsule by a semicircular incision corresponding with the upper border of the Patella.
- 13. Identify the Plica Adiposa Synovialis, and the Transverse Ligament.



X X X I
PELVIC JOINTS

Dissection for study of the ligaments is to be made on one side only, the other side being preserved for review of the muscles.

ARTICULATIO SACRO-ILLIACA (Page 259.)

Ligaments: Sacroiliacum anterius
Sacroiliacum posterius
Sacroiliacum interosseum
Sacrotuberous
Sacrospinous

- 1. Remove the soft tissues which cover the ligaments of the Sacro-iliac Joint anteriorly and posteriorly.
- 2. Identify the extent and direction of the joint surfaces on a prepared pelvic specimen or a skeleton.
- 3. By pressure on the two sides of the Pelvis, identify the limited amount of motion permitted in this joint.
- 4. Locate and identify the following ligaments—
Anterior Sacro-iliac
Posterior Sacro-iliac, Long and Short.
- 5. Try to locate the Interosseous Sacro-iliac Ligaments.
- 6. Completely expose and review the Sacro-tuberous and Sacro-spinous Ligaments of one side.

SYMPHYSIS OSSUM PUBIS (Page 259.)

Ligaments: Pubicum anterius }
Pubicum posterius } Interpubic fibrocartilaginous lamina
Pubicum superius
Arcuatum pubis

- 7. Remove all pelvic and hip muscles of one side excepting the Obturator Internus and Externus, and the extrapelvic portions of the Psoas and Iliacus.
- 8. Expose and identify the Ligaments listed above.
- 9. Test the mobility of the Symphysis.
- 10. Study the extent of the Articulation and its Fibro-cartilaginous Lamina.

ARTICULATIO COXAE (Page 259.)

Ligaments: Iliofemorale (Y-Ligament)
Pubocapsulare
Ischiocapsulare
Labrum glenoidale
Transversum acetabuli
Teres femoris

- 11. The present exposure allows an excellent opportunity to study the positions and to analyze the actions of the Obturator Internus and Externus muscles upon the hip joint; also the course and action of the Iliopsoas.
- 12. After reviewing these muscles, isolate the Obturator muscles and cut their origins from the Obturator Membrana to study its character and extent.
- 13. Posterior Surface. Cleanly expose the Articular Capsule of the Hip Joint identifying the ligamentous thickening by fibers forming the Ischiocapsular Ligament. Identify their direction and areas of attachment.
- 14. Anterior Surface. Similarly expose the Iliofemoral and Pubocapsular Ligaments and study their direction and points of attachment. Note the thinner portions of the Capsule between the ligaments.
- 15. Study the static function of the Iliofemoral Ligament for a relaxed standing posture.
- 16. Open the joint by an oblique incision along the medial portion of the Iliofemoral Ligament, following the line of the femoral neck. Dislocate the head of the femur forward by:
 - a. Flexion of the thigh to 90°, then
 - b. Abduction with external rotation.
- 17. Examine the femoral head and the Lig. Teres.
- 18. Reverse the movements and reduce the dislocation.
- 19. Make a second incision across the first at right angles to it, in order to open the joint more freely. Study the following structures:

Labrum Glenoidale	Fovea Capitis Femoris
Lig. Transversum Acetabuli	Lig. Teres and attachments
Incisura Acetabuli	Synovial Membrane and cartilaginous surfaces
Acetabulum	Extent and attachments of Capsule

Make sketches of the Hip joint showing the arrangement of its Ligaments, and lines of attachment of its Capsule.

X X X I I
JOINTS OF LEG AND FOOT

ARTICULATIO GENU (Page 261.)

<i>Ligaments:</i> Patellae	Popliteum obliquum
Collaterale tibiale	Cruciatum anterius
Collaterale fibulare	Cruciatum posterius
Transversum genu	Coronaria

- 1. Cut the Gracilis, Sartorius, Semitendinosus, Biceps Femoris and Adductor Magnus, one inch from their insertions.
- 2. Cut the Semimembranosus just below the beginning of its tendon. Observe how its fibers contribute in the formation of the Oblique Popliteal and Tibial Collateral Ligaments.
- 3. Cut the heads of the Gastrocnemius and Plantaris near their origins.
- 4. Identify the thin portions of the joint Capsule located at the margins of the Fossa Poplitea below the condyles.
- 5. Identify the Oblique Popliteal Ligament and its fusion with the lateral fibers of the insertion of the Semimembranosus muscle.
- 6. Anteriorly cut the Quadriceps about four inches above its patellar insertion and reflect the lower part with care to trace the continuation of the underlying Suprapatellar Bursa with the knee joint.
- 7. Try to locate the following Bursa:
 - a. Bursa Musculi Gastrocnemii
 - b. Bursa Musculi Semimembranosi Lateralis
 - c. Bursa Musculi Poplitei
- 8. Identify the Retinacula Patellae and isolate them from the Capsule on each side of the knee.
- 9. Isolate the Patellar Ligament from the capsule.
- 10. Carefully lift the coarse Crural Fascia on each side of the knee to identify the fibers of the Tibial and Fibular Collateral Ligaments. Note their extent and points of attachment. Dissect up the Popliteus muscle to complete the exposure of the Fibular Collateral Ligament.
- 11. Locate and clearly expose the Arcuate Popliteal Ligament.
- 12. Identify and follow the margin of the Capsule above and below the joint. Open the joint Capsule by a semicircular incision corresponding with the upper border of the Patella.
- 13. Identify the Plica Adiposa Synovialis, and the Transverse Ligament.

- 14. Identify and compare the shape of the Menisci of the two sides. Note the Anterior and Posterior Coronary attachments of the Menisci.
- 15. Locate the Ligament of Wrisberg; also, trace the tendon of the Popliteus muscle in relation to the joint.
- 16. Identify the two Cruciate Ligaments and study their attachments and relationship to each other.
- 17. Free the outer margins by cutting the Coronary Ligaments of the Menisci and lift to study the Tibial joint surfaces.
- 18. Identify the extent and attachments of the Capsule; also study the articular bone surfaces on a prepared specimen.

ARTICULATIO TIBIOFIBULARE (Page 261.)

Ligaments: Capituli fibulae anterius
Capituli fibulae posterius
Collaterale fibulare (Genu)

- 19. Identify the ligaments listed above and note their bony attachments.
- 20. Try to locate a connection between this joint and the Knee Capsule.
- 21. Expose and study the full extent of the Interosseous Membrane.

ARTICULATIO TALOCRURALIS (Page 261.)

Ligaments: Deltoidum
Calcaneofibulare
Talofibulare anterius
Talofibulare posterius

- 22. Cleanly expose the fan-shaped Deltoid Ligament, identifying its anterior, middle and posterior portions which converge upon the top of the Internal Malleolus.
- 23. Note the distal points of attachment.

Anterior
Middle
Posterior
- 24. On the lateral side of the ankle, expose and identify the Calcaneofibular Ligament; also the Anterior and Posterior Talofibular Ligaments and their attachments.
- 25. Trace the extent of the Capsule.
- 26. Cut the lateral ligaments and Capsule, and displace the foot medially to examine and study the interior of the joint.

SYNDESMOSIS TIBIOFIBULARIS (Page 261.)

Ligaments:

- Malleoli lateralis anterius
- Malleoli lateralis posterius
- Transversum
- Interosseum

- 27. Expose and identify the Anterior and Posterior Lateral Malleolar Ligaments.
- 28. Expose the Inferior Transverse Ligaments; study its structure and relation to the joint.
- 29. Identify the extent of the articulating surfaces, and of the Interosseous Ligament.

ARTICULATIO TALONAVICULARIS (Page 263.)

Ligaments:

- Talocalcaneum anterius
- Talocalcaneum posterius
- Talocalcaneum mediale
- Talocalcaneum laterale
- Talocalcaneum interosseum
- Talonavicularare dorsale
- Calcaneonaviculare plantare

- 30. On the medial side of the ankle posteriorly, locate and identify the Medial and Posterior Talocalcaneal Ligaments.
- 31. On the dorsum, identify the Dorsal Talonavicular Ligament then cleanly expose the Anterior and Lateral Talocalcaneal Ligaments on the outer side of the foot. Note their attachments.
- 32. Divide the three latter ligaments and inserting scissors between the Talus and Calcaneus, cut the Talocalcaneal Interosseous Ligament following the groove between the articular facets.
- 33. Separate the two bones to study their joint surfaces, and the Plantar Calcaneonaviculare Ligament which supports the head of the Talus (Fibrocartilage).

ARTICULATIO CALCANEOCUBOIDUM (Page 263.)

Ligaments:

- Plantare longum
- Calcaneocuboideum plantare
- Bifurcatum
- Calcaneocuboidem dorsale

- 34. On the dorsum of the foot, locate and identify the Dorsal Calcaneocuboid Ligament, also study the Bifurcated (Interosseous) Ligament noting its three points of attachment.

35. On the plantar side, expose and study the Long Plantar and the Short Plantar Calcaneocuboid Ligaments.

ARTICULATIO TRANSVERSA Tarsi (Chopart) Identify.

ARTICULATIO TARSOMETATARSAE (Lisfranc) (Page 263.)

36. Divide the dorsal ligaments to examine the interior and extent of these joints.

ARTICULATIONES METATARSOPHALANGEA (Page 265.)

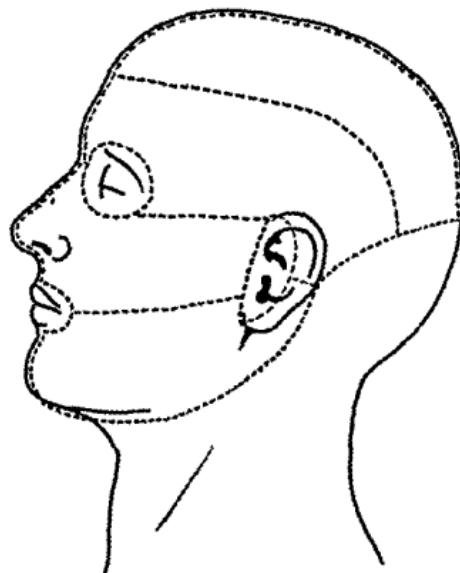
37. Open one or two of these joints noting the nature of their articular surfaces and the arrangement of their Plantar and Collateral ligaments.

ARTICULATIONES INTERPHALANGEAE (Page 265.)

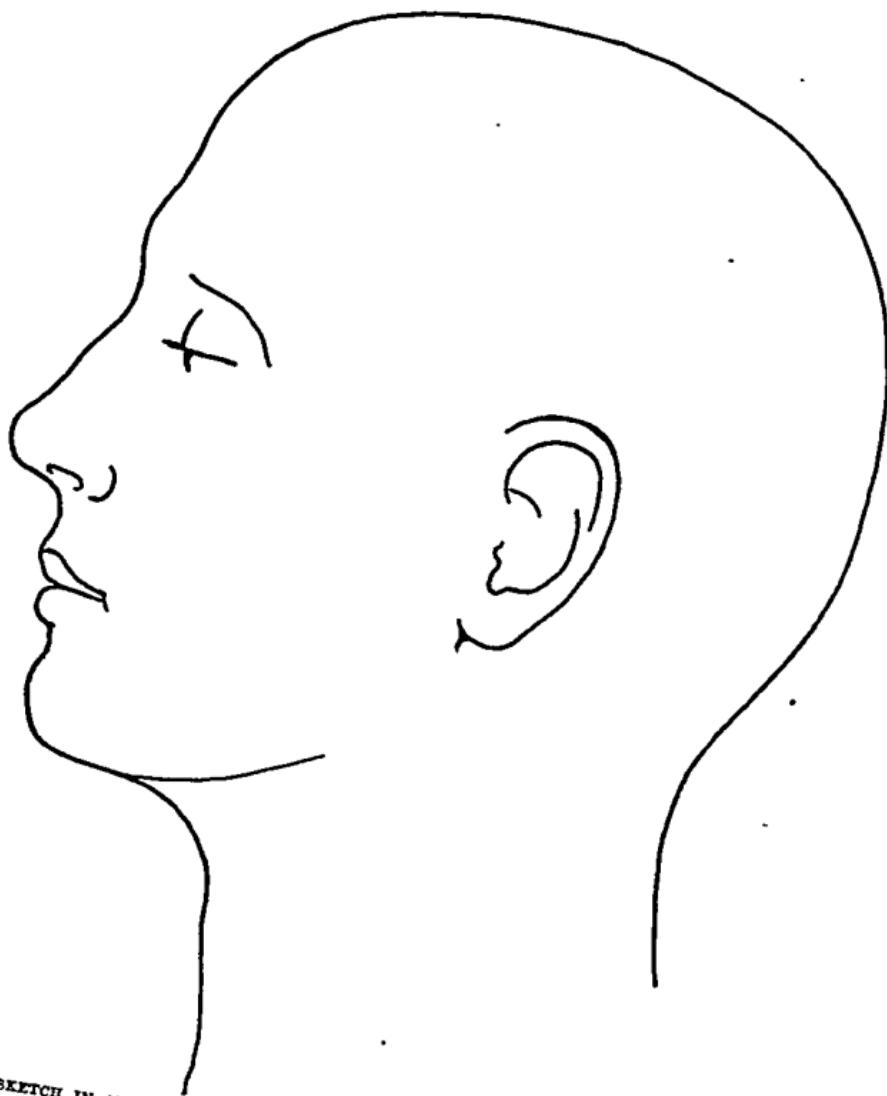
38. Examine these joints in the same manner.

Sketch lateral, medial and posterior views of the Knee Joint showing ligaments; also an interior (tibial) view showing the Cruciate Ligaments and menisci.

Draw lateral and medial views of the Ankle showing the location of its principal ligaments.







SKETCH IN AND LABEL THE SUPERFICIAL MUSCLES OF THE FACE AND SCALP

SUPERFICIAL MUSCLES OF HEAD AND NECK

A. TOPICS FOR DISCUSSION. Facial Musculature.

B. SPECIAL STUDY

Superficial Musculature: *Innervation: N. Facialis*

The superficial muscles of the face are intimately associated with the skin, and lie *within* the plane of Superficial Fascia. They have no covering of Deep Fascia as in the case of the skeletal muscles. Although they may have a bony attachment at one end, the opposite portion inserts into superficial soft parts, at times into cartilaginous structures (nares, external ear).

Neck: Platysma myoideus

Mouth: Orbicularis oris

Upper Lip:

Zygomaticus

Quadratus labii superioris

Caninus

Lower Lip and Chin:

Triangularis

Quadratus labii inferioris

Mentalis

Cheek:

Risorius

Buccinator (deep)

Eye:

Corrugator supercilii

Orbicularis oculi

Nose:

Procerus

Nasalis

Depressor septi

Dilator naris

Caput angulare (part of the Quadratus labii superioris)

Scalp:

Epicanthus

Frontalis

Occipitalis

Galea aponeurotica

Transversus nuchae

Ear:

Auricularis Anterior, Superior, and Posterior

C. INSPECTION AND PALPATION

Replace the Sternum and Clavicle, fastening them in place and stitching the superficial soft structures.

Processus Mastoideus; Angulus mandibulae; Protuberantia mentalis; Cartilago thyrodea (Adam's apple); Os hyoideum; Cartilago cricoidea; Trachea; Musculus sternocleidomastoideus; Fossa carotica.

Protuberantia frontalis; Tuber parietalis; Nasus (Nose) Cartilagine nasi, Septum and Alae; Arcus superciliaris; Margo supra-orbitalis and infra-orbitalis; Zygoma; Cartilago auriculæ.

D. DIRECTIONS FOR DISSECTION AND STUDY

- 1. a. Plot the face and neck as shown on page 166.
b. A midline incision is made from the vertex to the Sternum, with a circular incision following the border of the lips and also one about each eye just beyond the margin of the orbit, and around the root of the ear.
c. Transverse incisions as follows:
 1. Along the margin of the Mandible to the Mastoid Process.
 2. From the corner of the mouth to the External Ear.
 3. From the Orbit to the upper border of the Ear.
 4. From the Brow to the Parietal Eminence then down to the Mastoid Process.

On one side of the table, dissection should begin at the point of the chin to uncover the neck; on the other side, the dissection should start on the forehead and scalp.

Continue dissection in adjacent areas until all skin is removed from the anterior two-thirds of the head and neck except about the eyelids.

- 2. Expose for study the following muscles:

Platysma
Triangularis
Risorius
Mentalis

- 3. Raise the Triangularis from its attachment on the mandibular margin and expose the Quadratus Labii Inferioris.
- 4. Identify the borders of the Orbicularis Oris, then expose in turn the following:

Quadratus Labii Superioris
Zygomaticus
Nasalis
Procerus
Corrugator Supercilii

- 5. Carefully dissect the skin from the orbital area to expose the Orbicularis Oculi.
- 6. Lift the lower medial border of the Orbicularis Oculi to identify and expose the Caput Angulare of the Quadratus Labii Superioris.
- 7. Separate the Quadratus and Zygomaticus to locate and identify the Caninus.
- 8. Complete uncovering of the Epicranium identifying its three parts and their extent; Frontalis, Galea Aponeurotica, and Occipitalis.

9. *Layers of Scalp.* Make an opening in the Galea and identify the following layers of the Scalp:

Skin
Superficial fascia
Galea Aponeurotica
Subaponeurotic layer
Pericranium

10. Try to locate and identify the three muscles of the ear, Auricularis Anterior, Superior and Posterior. Sketch the External Ear and label its parts.

Platysma
.....
.....
.....

Triangularis
.....
.....

Quadratus Labii Inferioris
.....
.....

Mentalis
.....
.....

Orbicularis Oris
.....
.....

Zygomaticus
.....
.....

Quadratus Labii Superioris
.....
.....

Caput Angulare
Caninus
.....

Risorius
.....

Buccinator
.....

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Nasalis
Procerus
Corrugator Supercilii

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- 7. Separate the Quadratus and Zygomaticus to locate and identify the Caninus.
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9. *Layers of Scalp.* Make an opening in the Galea and identify the following layers of the Scalp:

Skin
Superficial fascia
Galea Aponeurotica
Subaponeurotic layer
Pericranium

10. Try to locate and identify the three muscles of the ear, Auricularis Anterior, Superior and Posterior. Sketch the External Ear and label its parts.

Platysma.....
.....
.....

Triangularis.....
.....

Quadratus Labii Inferioris

Mentalis.....
.....

Orbicularis Oris..
.....

Zygomaticus ..
.....

Quadratus Labii Superioris ..
.....

Caput Angulare ..
.....

Caninus ..
.....

Risorius ..
.....

Buccinator ..
.....

Orbicularis Oculi
Corrugator Supercilii
Procerus
Nasalis
Dilator Naris
Depressor Septi Nasi
Epicranius
Galea Aponeurotica
Auricularis Anterior
Auricularis Superior
Auricularis Posterior

Study and describe the following bones, on pages 243, 245, and 249:

Temporal
Maxilla
Zygomatic

Nasal
Mandible
Hyoid

X X X I V
FACE (DEEPER STRUCTURES)

A. TOPICS FOR DISCUSSION. Mastication. Dentition.

B. SPECIAL STUDY

Bones: Os temporale, Maxilla, Os zygomaticum, Os nasale, Mandibula, Os hyoidium

Joints: Temporomandibulare

Dentition: Deciduous and permanent

Fasciae: Temporalis superficialis, Temporalis profunda, Parotideomasseterica

Muscles of Mastication: *Innervation:* Trigeminus

Masseter Pterygoideus externus

Temporalis Pterygoideus internus

(Buccinator*)

Glands: Glandula parotis, Glandula parotis accessoria

Corpus adiposum buccae (Bischet)

* Not classified as a muscle of mastication but functionally important.

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Reflect the Platysma and Risorius muscles downward.
- 2. Identify the expanse of the Parotideomasseteric Fascia.
- 3. Incise the Fascia along a vertical line one-half inch anterior to the ear and continue horizontally along the lower edge of the Zygomatic Arch.
- 4. Reflect the Fascia carefully forward and downward to expose the edge of the Parotid Gland. With particular care uncover the Parotid Duct (Stenson's) which runs forward the width of a finger below the Zygomatic Arch and parallel to it. Note the presence of an Accessory Parotid Gland.
- 5. Follow the Fascia forward to where it dips down at the anterior border of the Masseter muscle. Identify the Corpus Adiposum Buccae and remove.
- 6. Complete the tracing of Stenson's Duct to the mouth, noting the position of its orifice opposite the second upper molar tooth.
- 7. Identify and expose the portion of the Buccinator muscle not covered by the Masseter.
- 8. Lift the Parotid Gland with its deep retromandibular extension from position and reflect forward on the cheek preserving the Duct intact.

- 9. Complete the exposure of the Masseter muscle, identifying the direction of the fibers of its superficial portion. Cut this portion along its zygomatic origin and reflect downward to expose the deeper portion.
- 10. Cut the superficial layer of the Temporal Fascia along the Superior Temporal Line and downward anteriorly to the Zygomatic bone. Reflect this layer of Fascia downward, and note the deposit of fat between the superficial and deep layers of this Fascia.
- 11. Complete the uncovering of the Temporal muscle by removal of the deeper layer of Temporal Fascia.
- 12. Extend the exposure of the Buccinator Muscle by cutting the origin of the deeper portion of the Masseter; study the attachments of the former and the directions of its fibers.
- 13. Locate the insertion of the Temporal muscle and identify the **Incisura Mandibularis**.
- 14. Exposure of the Pterygoid muscles will be undertaken later. Identify the position of each on a prepared skull.

Describe the Mandibular Joint (page 265), and Dentition (page 176).

MASSETER

Joint.....

Pars Superficialis

Action.....

Origin.....

Pars Profunda

Action.....

Origin.....

Insertion.....

Nerve Supply.....

TEMPORALIS

Joint.....

Action.....

Origin.....

Insertion.....

Nerve Supply.....

PTERYGOIDEUS EXTERNUS

Joint.....

Action.....

Origin.....

Insertion.....

Nerve Supply.....

PTERYGOIDEUS INTERNUS

Joint.....

Action.....

Origin.....

Insertion.....

Nerve Supply.....

176

FACE (DEEPER STRUCTURES)

GLANDULA PAROTIS AND DUCT (STENSON'S)

DENTITION

Deciduous

Permanent

INFRAHYOID AND SUPRAHYOID STRUCTURES (INCLUDING FLOOR OF MOUTH)

A. TOPICS FOR DISCUSSION. Mechanism of Swallowing.

B. SPECIAL STUDY

Bones: Os Hyoideum

Fasciae:

Superficial Contains Platysma

Deep (cervical) 3 major divisions (anteriorly)

- a. External (two incomplete layers, Burns's Suprasternal Space)
- b. Pretracheal and Carotid Sheath
- c. Prevertebral

Muscles: (Include innervation in description. Pages 180, 181).

Sternocleidomastoideus (Page 195)

Infrahyoid:

Omohyoideus
Sternohyoideus
Sternothyroideus
Thyrohyoideus

Suprahyoid:

Digastricus
Stylohyoideus
Mylohyoideus
Geniohyoideus
Stylopharyngeus

Tongue (Extrinsic muscles):

Genioglossus
Styloglossus

Glossopalatinus
Hyoglossus

Glands:

Thyroidea
Parathyroidea
Submaxillaris

Sublingualis
Labiales oris
Buccales

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Dissect the Platysma from the anterior surface of the neck leaving the superficial layer of Deep Fascia in place.
- 2. Starting at the lateral border of the Sternocleidomastoideus dissect up the Deep Fascia covering this muscle. Anteriorly try to identify the Suprasternal Space (Burns's) formed by the superficial and deeper layers of the external division of Deep Fascia.

The space extends upward from the upper border of the Sternum to nearly the level of the Cricoid Cartilage, and laterally between the medial borders of the Sternocleidomastoid of each side.

- 3. Study a cross-section of the Neck for the distribution of Cervical Fascia. Note the location of the Carotid Sheath.
- 4. Isolate the Sternal and Clavicular portions of the Sternocleidomastoid, and extend the dissection to a complete exposure of this muscle. Cut the Sternocleidomastoid at the center reflecting the halves.

INFRAHYOID REGION

- 5. Uncover the Omohyoid Muscle. Identify the Cervical Fascia which encloses it and note that it is continuous with the Carotid Sheath enveloping the large vessels of the neck. Isolate both bellies of the muscle.
- 6. Isolate the Sternohyoid and cut it close to its sternal attachment.
- 7. Isolate the Sternothyroid.
- 8. Cut the Sternothyroid muscles at their sternal attachment, and lift to expose the Thyroid Glands.
- 9. Cut the sheath of the Gland along its lateral border and lift the gland toward the medial line stripping away the sheath posteriorly. Try to locate and identify the Parathyroids.
- 10. Expose and identify the Thyrohyoid, and also the Cricothyroid muscle of the Larynx. Identify the Cricoid cartilages of the Trachea.
- 11. Open the Carotid sheath and identify the Carotid Artery, Internal Jugular Vein and Vagus Nerve.

SUPRAHYOID REGION

- 12. Note the intimate attachment of the Deep Fascia to the Hyoid bone. It has a superficial and a deep layer between this bone and the mandible.
- 13. Cut the superficial layer of Deep fascia along the border of the Mandible, and reflect downward. The space beneath this layer fascia contains the Submaxillary Gland, also the Digastric and Stylohyoid muscles.
- 14. In dissecting and isolating the two bellies of the Digastric muscle be careful to preserve the fascial loop which binds its middle tendinous portion to the Hyoid bone. Also isolate the Stylohyoid muscle.
- 15. Observe the blood vessels entering the Submaxillary Gland posteriorly. Lift the gland backward by blunt dissection for study of its shape and size.
- 16. Cut the anterior belly of the Digastric one-half inch from its origin and expose the Mylohyoid muscle.
- 17. Cut the Mylohyoid one-quarter inch from along its origin on the Linea Mylohyoidea of the Mandible, and reflect downward medial raphe.

- 18. Identify and trace the course of Wharton's Duct from the Gland to its termination beside the Frenulum of the Tongue.
- 19. Expose and isolate the Geniohyoid, and identify the Hyoglossus.
- 20. Cut the Geniohyoid and uncover the Genioglossus.
- 21. Identify the lower portion of the Styloglossus, and the Sublingual Gland.
- 22. Try to locate the Stylopharyngeus close behind the Styloglossus, and deep to the Stylohyoid.
- 23. Force open the mouth and observe the Palate, hard and soft, Uvula, Frenulum linguae, and the Plica Sublingualis.
- 24. Dissect away the mucous membrane on the inner surface of the upper and lower lips to identify the Labial Glands. Also lift the Buccinator muscle to identify the underlying Buccal Glands.
Note: These small glands can be felt with the tongue in your own mouth.
Study and describe the Sphenoid Bone. (Page 245.)

GLANDULA SUBMAXILLARIS AND DUCT (WHARTON'S)**GLANDULA SUBLINGUALIS AND DUCTS****GLANDULAE LABIALES ORIS****GLANDULAE BUCCALES**

INFRAYHOID MUSCLES Nerve Supply.....**Omohyoideus.....**

Sternohyoideus.....

Sternothyroideus.....

Thyrohyoideus

SUPRAHYOID MUSCLES Include Nerve Supply in description.**Digastricus.....**

Nerve Supply.....

Mylohyoideus.....

Geniohyoideus.....

TONGUE, EXTRINSIC MUSCLES Nerve Supply.....	.....
Genioglossus.....	.....
Styloglossus.....	.....
Hyoglossus.....	.....
Glossopalatinus.....	.....
Stylopharyngeus.....	.....
Glandulae Thyroideae	

Glandulae Parathyroideae

X X X V I
TONGUE AND PHARYNX

A. TOPICS FOR DISCUSSION. Taste and Smell.

B. SPECIAL STUDY

Tongue:

Muscles: (Include innervation in descriptions. Pages 181, 187).

Extrinsic:

Genioglossus
Hyoglossus
Styloglossus
Glossopalatinus

Intrinsic:

Transversus linguae
Longitudinalis superior
Longitudinalis inferior
Verticalis linguae

Papillae: Filiformes, Fungiformes, Vallatae

Tonsillae linguaes

Glandulae sublinguaes

Palate: Palatum durum

Palatum molle

Muscles: (Include innervation in descriptions. Page 187).

Levator veli palatini

Tensor veli palatin

Musculus uvulae

Glossopalatinus

Pharyngeopalatinus

Pharynx:

Muscles: (Include innervation in descriptions. Pages 187, 188).

Constrictores:

Pharyngis superior (Cephalopharyngeus)

Pharyngis medius (Hyopharyngeus)

Pharyngis inferior (Laryngeopharyngeus)

Levatores:

Levator pharyngis

Stylopharyngeus

Pharyngeopalatinus

Tonsillae palatinae

C. DIRECTIONS FOR DISSECTION AND STUDY

1. Review the Suprathyroid and extrinsic muscles of the Tongue.

- 2. Open the mouth and observe the conformation of the Hard Palate; locate the union of the Hard and Soft Palates in relation to the molar teeth. Identify the Uvula, the Anterior and Posterior Pillars of the Pharynx and the position of the Palatine Tonsils.
- 3. Externally, review the relations of the large Blood vessels, Nerves, Pharynx, Larynx, Thyroid Glands, Trachea and Oesophagus.

REMOVAL OF PHARYNX, AND ADJACENT STRUCTURES

Block under shoulders and head hyperextended.

- 4. a. Locate the Prevertebral layer of Cervical Fascia on each side of the neck. By splitting this layer of fascia, lift the Pharynx, Oesophagus and adjacent structures forward, separating them from the vertebral column and its deep muscles. Extend the separation from the Thorax to the posterior Pharyngeal wall at the base of the skull.
- b. Cut the Styloid muscles from their origin on the process.
- c. Close the Mandible and starting at the midpoint, cut the Genioglossus from its origin and continue laterally on each side the length of the Alveolar border.
- d. Pull down the tongue and larynx by hooking a finger over the tongue, and cut transversely across the Soft Palate along its attachment to the Hard Palate. With added traction, cut transversely the Post-pharyngeal wall as high in the Naso-pharynx as possible.
- e. Complete the separation of the lateral pharyngeal wall from its attachments and remove the Pharynx, Tongue and associated structures *en masse*.
- 5. Review the Soft Palate and Fauces; Anterior and Posterior Pharyngeal Pillars and Tonsils.
- 6. Expose the Styloglossus and Hyoglossus muscles by removing the mucous membrane on the side of the Tongue. Note their relationship and extent.
- 7. Locate the Glossopalatinus and observe its relation to the Anterior Pillar.
- 8. Lift the mucous membrane from the upper surface of the soft Palate. Identify the muscle fibers of the Uvula, and trace those of the Pharyngopalatinus forming the Posterior Pillar of the Fauces.
- 9. Locate the Tensor and Levator Veli Palatini, and study their position to the skull bones. Also, identify the positions of the two Pterygoid muscles.
- 10. Study the Tongue noting its general shape, parts and attachments.
- 11. Identify its Papillae; Filiformes, Fungiformes, and Vallatae, noting their characteristic locations. Also the Tonsillae Linguae.

- 12. Try to locate the Foramen Caecum and make notes on its embryological significance.
- 13. Note the relation of the base of the Tongue to the Epiglottis, identifying the Median and Lateral Glossoepiglottic Folds, and the intervening Valleculae.
- 14. Dissect out the Glandula Sublingualis noting its position to the Tongue and the location and character of its ducts.
- 15. Expose completely the Hyoglossus and Genioglossus.
- 16. Section half of the Tongue to identify and trace the fibers of its Intrinsic muscles:

Longitudinalis Superior
Longitudinalis Inferior
Transversus Linguae
Verticalis Linguae

Study the action of all Tongue muscles in various movements of your own tongue.

- 17. Identify the orifices of the Pharynx:

Anterior: Cavum Nasale
Cavum Oris Proprium
Antero-inferior: Cavum Laryngis
Postero-inferior: Oesophagus
Lateral: Tubae Auditivae (Eustachii)

- 18. Distend the Pharynx with cotton to facilitate dissection of the Constrictor Muscles.
- 19. Remove posteriorly and laterally the connective tissue covering (Tunica adventitia) of the Inferior Constrictor.
Identify the layers of the Pharyngeal wall:

Tunica adventitia
Tunica muscularis
Tela Submucosa
Membrana Mucosa

- 20. Identify the three parts of the Inferior Constrictor muscle:

Thyreopharyngeus
Cricopharyngeus
Tracheopharyngeus

- 21. Raise the superior border of the Inferior Constrictor in order to identify the two parts of the Middle Constrictor:

Chondropharyngeus
Ceratopharyngeus

22. Identify the stump of the Stylopharyngeus between the Middle and Superior Constrictors.
23. Reflect the upper part of the Middle Constrictor and identify the following portions of the Superior Constrictor with the help of an atlas:

Petropharyngeus
Pterygopharyngeus
Salpingopharyngeus
Buccopharyngeus
Mylopharyngeus
Glossopharyngeus

24. Open up the Pharynx by a posterior sagittal incision and identify the following:

Plica Pharyngo-epiglottica
Epiglottis
Plica Aryepiglottica
Tuberculum Cuneiforme (Wrisberg)
Corniculatum (Santorini)
Incisura Interarytenoidea
Recessus Piriformis

25. Study the Oesophagus throughout its extent by splitting its posterior wall.

Study and describe the Occipital, Ethmoid and Lacrimal bones. (Pages 245, 247, 249.)

PAPILLAE Define.

Fungiformes.....
.....
.....

Vallatae.....
.....
.....

Filiformes.....
.....
.....

INTRINSIC MUSCLES OF THE TONGUE

Transversus Linguae.....	.....
.....
Longitudinalis Superior.....	.....
.....
Longitudinalis Inferior.....	.....
.....
Verticalis Linguae.....	.....
.....
Nerve Supply of the Tongue.....	.....
.....
.....

MUSCLES OF PALATE Include Nerve Supply.

Levator Veli palatini.....	.....
.....
.....
Tensor Veli palatini.....	.....
.....
Musculus Uvulae.....	.....
.....
.....
Pharyngeal-palatinus.....	.....
.....
Constrictor Superior Discuss Briefly.	

Constrictor Medius

Constrictor Inferior

Levators of Larynx and Pharynx General Mechanism.

X X X V I I
L A R Y N X

A. TOPICS FOR DISCUSSION. Speech. Vocal Cords

B. SPECIAL STUDY

Cartilages:

Cricoidea	Cuneiformes (Wrisberg)
Thyroidea	Corniculatae (Santorini)
Arytenoideae	Epiglottica

Muscles: All innervated by N. Laryngeus inferior except*

External:

Cricothyroideus* (Innervated by N. Laryngeus externus)

Internal:

Cricoarytenoideus posterior
Cricoarytenoideus oblique
Interarytenoideus oblique
Interarytenoideus transversus

Lateral:

Cricoarytenoideus lateralis
Thyreoarytenoideus internus (Vocalis)
Thyreoarytenoideus externus
Thyreoaryepiglotticus

Carum Laryngis:

Plica ventricularis (False cord)

Plica vocalis (Vocal cord)

Ventriculus laryngis

Glottis

Rima glotticus:

pars intermembranacea
pars intercartilaginea

Glandulae laryngis

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Remove the muscles between the Hyoid bone and Thyroid cartilage to expose the Hyothyroid Membrane; identify its stronger portions as the Middle and Lateral Hyothyroid Ligaments.
- 2. Laterally, expose the External muscles, Cricothyroid, identifying its Pars Recta and Pars Obliqua.
- 3. Locate the Cricothyroid Ligament, a part of the Conus Elasticus.
- 4. Identify the Cricotracheal Ligament.

EXPOSURE OF THE INTERNAL MUSCLES

- 5. Cut away the Pharyngeal muscles and the Oesophagus.
- 6. Clean the mucous membrane and areolar tissue from the posterior surface of the Larynx to uncover the *Cricoarytenoideus Posterior* and the *Arytenoideus Obliquus* and *Transversus*.
- 7. Cut away the right half of the Thyroid cartilages, to expose the *Thyreo-arytenoideus Externus*, the *Aryepiglotticus*, and locate the fibers of the *Thyreoepiglotticus*, the anterior part of the *Thyreo-arytenoideus*.
- 8. Identify and expose the *Cricoarytenoideus Lateralis*.
- 9. Study the action of the *Thyreoarytenoidei*, *Arytenoidei* and *Aryepiglottic* muscles in closing the Larynx (swallowing) by approximating the Arytenoid cartilages and Epiglottis.
- 10. Cut the Hyoid bone and Tongue from the Larynx. Split the latter in midline including the Epiglottis and upper part of the Trachea.
- 11. On the inner surface of the Larynx, identify:
 - Plica Ventricularis (False cords)
 - Plica Vocalis (True cords)
 - Ventriculus Laryngis
 - Appendix Ventriculi Laryngis
 - Glandulae Laryngis
- 12. Identify the triangular-shaped membrane *Conus Elasticus*, extending between the Thyroid and Cricoid cartilages anteriorly and laterally, and connected above with the *Processus Vocalis* of the Arytenoid Cartilages. It is intimately associated with the mechanism of speech, containing the *Ligamentum Vocale* and *Musculus Vocalis* (*Thyreoarytenoideus Internus*). Its internal superior border forms the Vocal Cords (Plica Vocalis).
- 13. Cut the right half of the Larynx from the Trachea and preserve for study of dissected muscles. On the left half, carefully dissect away the membranous covering of the inner surface in order to expose the Vocal Ligament (immediately under the membrane) and beside it, the *Vocalis* muscle (*Thyreo-arytenoideus Internus*). Expose their attachments to the Vocal process of the Arytenoid cartilage and to the Thyroid cartilage.
- 14. Study the action of the Laryngeal muscles upon the Arytenoid cartilages in controlling vocal sounds.
- 15. Extend the dissection to study the *Conus Elasticus*, the small cartilages, the Epiglottis and its attachment. Expose and study the Hyoid bone.
- 16. Split the Trachea and study its wall structure and internal surface. Complete its description.

LARYNX**Cartilages**

Thyroidea

Cricoidea

Arytenoidea

Corniculata (Santorini)

Cuneiformis (Wrisberg)

Epiglottica

General description**TRACHEA**

Cricothyroideus.....
.....
.....
.....
.....
Crico-arytenoideus Posterior.....
.....
.....
.....
.....
Crico-arytenoideus Lateralis.....
.....
.....
.....
.....
Arytenoideus Obliquus.....
.....
.....
.....
.....
Arytenoideus Transversus.....
.....
.....
.....
Vocalis (Thyreo-arytenoideus Internus).....
.....
.....
.....
.....
Thyreo-arytenoideus Externus.....
.....
.....
.....
.....
Thyreo-epiglotticus.....
.....
.....
.....

X X X V I I I
NECK (VERTEBRAL STRUCTURES)

A. TOPICS FOR DISCUSSION. Movements of the Head and Neck.

B. SPECIAL STUDY

Bones:

Vertebrae cervicales

Os occipitale

Os temporale

Joints:

Articulatio atlanto-occipitalis

Articulatio atlanto-epistrophica

Ligaments:

Membrana atlanto-occipitalis anterior

Membrana atlanto-occipitalis posterior

Ligamentum cruciatum atlantis

Ligamentum transversum atlantis

Ligamentum alaria atlantis

Membrana tectoria

(and the smaller ligaments)

Muscles:

Innervation: Cervicales

Lateral:

Scalenus anterior

Scalenus medius

Scalenus posterior

Medial:

Longus colli

Longus capitis

Rectus capitis anterior

Rectus capitis lateralis

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Identify the trunks of the Brachial Plexus and their relation to the Scalenus muscles.
- 2. Isolate and study the Scalenus Anterior, Medius and Posterior.
- 3. Isolate and study the Longus Capitis.
- 4. Expose and isolate the three parts of the Longus Colli.
- 5. Expose and study the Rectus Capitis Lateralis, and Anterior.

6. Study on a prepared specimen or skeleton, the position of the following ligamentous structures:

Anterior Atlanto-occipita Membrane
Lateral Atlanto-occipital Ligament
Anterior Atlanto-axial Ligament
Anterior Longitudinal Ligament
Cruciate (Transverse) Ligament of the Atlas
Posterior Atlanto-occipital Membrane
Posterior Atlanto-axial Ligament
Membrana Tectoria (Occipito-axial)
Alar Ligaments
Apical Odontoid Ligament
Posterior Longitudinal Ligament
Capsular Ligaments
Ligamenta Flava
Interspinal Ligaments

7. Review all the muscles of the back of the neck and study their individual and group actions in movements of the head.

Study and describe the Frontal, and Parietal bones. (Page 247.)

Describe the Occipito-atlantal and Atlanto-axial joints. (Page 265.)

STERNOCLÉIDOMASTOÏDEUS

Joints.....
Position.....
Actions.....
.....
Origins.....
.....
Insertion.....
Nerve Supply..... from.....

SCALENUS ANTERIOR

Joints.....
Position.....
Action.....
Origins.....
Insertion.....
Nerve Supply..... from.....

SCALENUS MEDIUS

Joints.....
Position.....
Action.....
Origins.....
Insertion.....
Nerve Supply..... from.....

SCALENUS POSTERIOR

Joints.....
Position.....
Action.....
Origins.....
Insertion.....
Nerve Supply..... from.....

X X X I X
E Y E

A. TOPICS FOR DISCUSSION. Morphology of the Eye. Mechanism of Sight.

B. SPECIAL STUDY

Bones (of the Orbit):

Eyelids:

Tarsus, superior and inferior
Palpebral fascia
Glandulae tarsales (Meibomii)

Glandula lacrimalis and ducts
Saccus lacrimalis and ducts
Ductus naso-lacrimalis

Bulbus Oculi:

Tunicae (three layers)
Sclera, Cornea
Choroidea, Corpus ciliare, Iris
Retina

Corpus vitreum
Camera oculi, Anterior and posterior
Papilla nervi optici, Excavatio papillae
Macula lutea, Fovea centralis

Lens crystallina

Muscles:

Levator palpebrae superioris
Rectus superior
Rectus inferior
Rectus lateralis
Rectus medialis
Obliquus superior
Obliquus inferior

Innervation:

Oculomotorius
Oculomotorius
Oculomotorius
Abducens
Oculomotorius
Trochlearis
Oculomotorius

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Inject the eyeball with water or preserving fluid.
- 2. Identify the Caruncula Lacrimalis and Plica Semilunaris, also the location of the Papillae Lacrimales on the upper and lower lids and their openings (Puncta) of the Lacrimal Ducts.
- 3. Locate the Puncta and probe with a hair or thin bristle.
- 4. Carefully dissect the Orbicularis Oculi (palpebral portion) toward the rim of the eyelids, and expose the Tarsi and the Palpebral Fascia. Note their extent.
- 5. Try to identify the most superficial fibers of the Levator Palpebrae Superioris blending with the Fascia.
- 6. Identify the Medial Palpebral Ligament and the Lateral Palpebral Raphe.

- 7. Identify the Lacrimal Sac lying beneath the Medial Ligament.
- 8. Evert the Tarsi to identify the Tarsal Glands (Meibomii), and their openings on the margin of the lids.
- 9. Locate the Superior and Inferior Palpebral Fornices.
- 10. Cut the Periorbita (Periosteum) along the margin of the Orbit and separate it entirely from the orbital walls. Remove the Eye and Lids *en masse*, by cutting the muscles and nerves posteriorly.
- 11. Identify and study the position and size of the Glandula Lacrimalis.
- 12. Identify and trace the course of the Levator Palpebrae Superioris.
- 13. Expose the four Recti muscles of the eye, and the two Oblique. Study their separate actions.
- 14. Make a circular cut along the margin of the Sclera and four radial cuts to reflect the Sclera to expose the Choroidea. Similarly lift the Choroidea to identify the Retina.
- 15. Identify and cut the Cornea to note its thickness, and to enter the Anterior Chamber.
- 16. Study the Iris and probe through the Pupil to identify the extent of the Posterior Chamber and its relation to the Lens.
- 17. Note manner of fixation of the Lens; remove the latter and examine.
- 18. Section the Eyeball sagitally to study its interior; the Corpus Vitreum, Retinal Wall, Papilla Nervi Optici and Macula Lutea.
- 19. Draw a vertical section of the Eyeball and Orbit, to show the position of the eye structures. Also show by a diagram the action of the eye muscles.
- 20. Review all the bones of the Orbit, and Nose. Describe the Inferior Turbinate bone (page 247).

OCULUS (Eye)

MUSCLE OF LID

E Y E

Levator Palpebrae Superioris.

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MUSCLES OF EYEBALL Include Nerve Supply.

Rectus Superior.

Rectus Inferior.

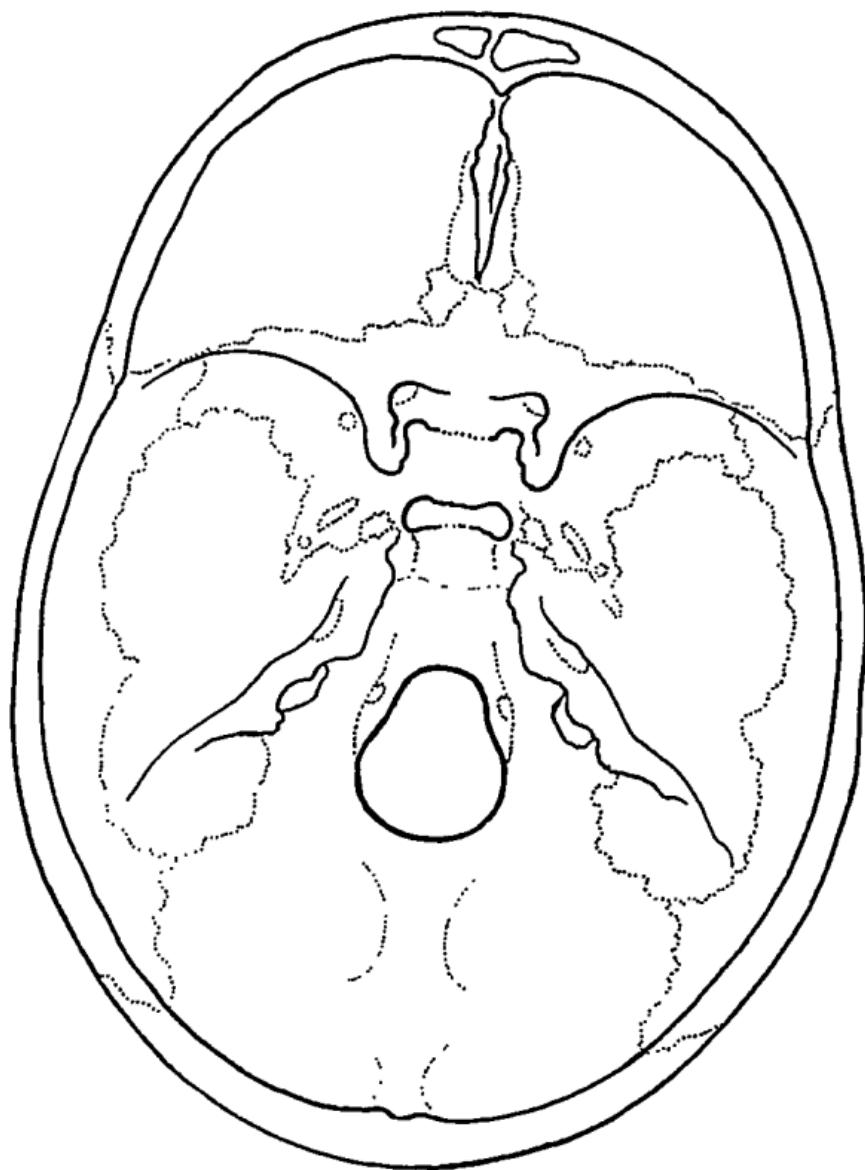
Rectus Lateralis.

Rectus Medialis.

Obliquus Superior.

Obliquus Inferior.

MECHANISM OF IRIS AND PUPIL Briefly describe.



X L
CRANIAL CAVITY

A. TOPICS FOR DISCUSSION. Development of the Brain.

B. SPECIAL STUDY

Bones: Cranial Floor and Vault

Encephalon:

Cerebrum	Pons
Cerebellum	Medulla

Meninges:

Dura mater	
Falx cerebri	Falx cerebelli
Tentorium cerebelli	Diaphragma sellae
Arachnoidea	
Cavum hyparachnoideale	
Pia mater	

Sinuses:

Sagittalis superior	Petrosus superior
Sagittalis inferior	Petrosus inferior
Rectus	Intercavernosus anterior
Transversus	Intercavernosus posterior
Confluens sinuum	Occipitalis
Cavernosus	Sigmoideus
Circularis	Basilaris

C. DIRECTIONS FOR DISSECTION AND STUDY

REMOVAL OF CALVARIUM

- i. a. Strip all soft structures from the cranial bones to the level of the supra-orbital ridges anteriorly and the External Occipital Protuberance posteriorly.
 - b. Tie a string around the skull one inch above the Orbital margins and one inch above the External Occipital Protuberance in order to obtain a straight line for sawing. Mark the line on the skull bones and remove the string.
 - c. In order to avoid injury to the brain and meninges, saw first, through only the outer plate of bone all around the skull; then saw carefully through the inner plate. Pry the Calvarium loose, separating the Dura Mater from its inner surface.

- 2. Observe on the inner surface of the Calvarium the Impressiones Digitae corresponding to the cerebral convolutions, also the Sulci for arteries and veins.
 - 3. Identify the Sulcus Sagittalis, and the Foveolae Paccioni, irregular small pittings in the bone. Note their distribution and their correspondence on the Dura, with the Arachnoideal Granulations (Pacchianian Bodies). Describe the structure of the latter.
 - 4. Study the structure of the Diploe of the skull between the inner and outer plates.
 - 5. Identify the Sutures of the skull and note presence of any Wormian Bones, or anomalous Sutures.
 - 6. Study the Dura Mater, and its composition. What is its relation to the Venous Sinuses?
 - 7. Locate and trace the distribution of the Middle Meningeal Artery.
 - 8. Slit the Superior Sagittal Sinus to examine its interior, then with blunt-pointed scissors, cut the Dura Mater along the sawn edge of the skull, being careful not to injure the brain. Reflect the two sides of the Dura Mater toward its central portion—the Falx Cerebri.
 - 9. Examine the inner surface of the Dura Mater and the Arachnoid Membrane. Identify the Subdural and Subarachnoid Spaces. In which of these is the Cerebrospinal Fluid contained?
-

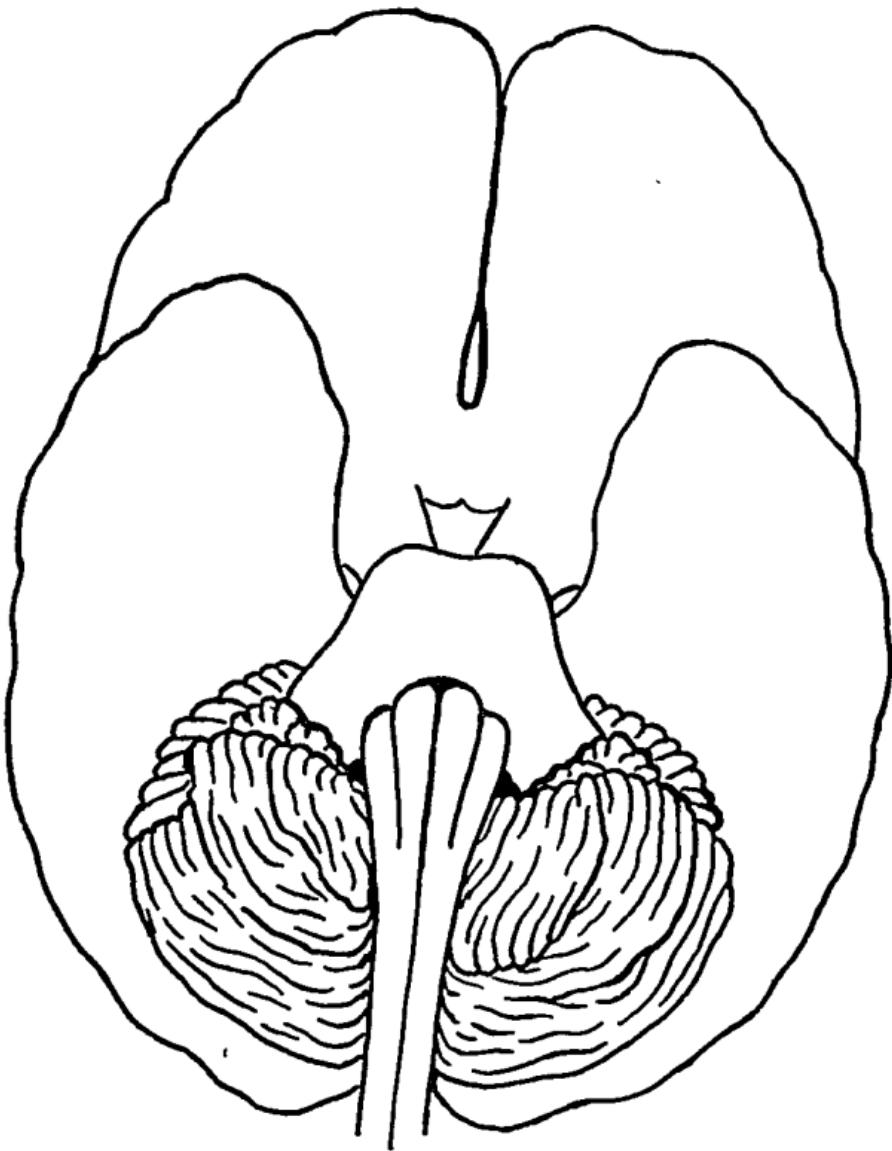
REMOVAL OF THE BRAIN

- 10. Cut the insertion of the Falx Cerebri from the Crista galli and reflect the entire Dura Mater backward.
- 11. Place a block under the neck, permitting the head to tilt backwards. Supporting the brain with one hand, lift the Frontal Lobe with the other hand and identify the Olfactory Bulbs lying upon the Ethmoid bone. Separate them from the bone and raise to identify the Optic Nerves and Internal Carotid Arteries beneath the latter.
- 12. Identify the Chiasma and cut the right Optic Nerve where it leaves this structure. The left Optic Nerve should be cut near the base of the skull. Divide the Internal Carotid Artery of each side near the bone.
- 13. Identify the stem of the Hypophysis lying between the Arteries and slightly posterior, and cut.
- 14. During the subsequent procedure, continue to support and gently retract the Brain from the base of the skull. Identify the Cranial Nerves before dividing, cutting those on the right side near the Brain, the left ones near the skull bones.

- 15. Locate the Oculomotor Nerve (III), and posterior to it, the Trochlear (IV) Nerve, and divide.
- 16. Identify the Tentorium Cerebri and its attachment to the petrous portion of the Temporal bone by lifting the Temporal lobes. On each side cut the Tentorium along its line of attachment, swinging posteriorly upon the Occipital bone for a short distance at the lateral end of the cut.
- 17. Locate the Trigeminal Nerve (V), and more deeply and medially the Abducent Nerve (VI). Divide them as directed.
- 18. Laterally and below the cut edge of the Tentorium, locate the Facial (VII) and Acoustic (VIII) Nerves. Cut them.
- 19. More deeply and medially, identify the Glossopharyngeal (IX), Vagus (X), and Spinal Accessory (XI) Nerves passing into the Jugular Foramen. Also locate the strands of the Hypoglossal Nerve (XII) stretching from the Medulla. Divide them.
- 20. Increase the traction on the Brain, and cut the Vertebral Arteries and Spinal Cord as deeply through the Foramen Magnum as possible. Carefully complete the removal of brain and preserve in formalin solution for later study.
- 21. Identify the position of the margins of individual bones forming the cranial floor by comparison with a prepared skull.
- 22. Replace the Tentorium and Falx in position and study the Cerebral compartments in relation to the various parts of the Brain. Note how these membranes limit movements of the Brain in all directions.
- 23. Locate and cut the Diaphragma Sellae to remove the Hypophysis (Pituitary Gland). Examine and describe.
- 24. Locate and trace the following Sinuses, cutting open their walls to identify their communications:

Sagittalis superior	Cavernosus
Sagittalis inferior	Circularis
Rectus	Intercavernosus anterior
Transversus	Intercavernosus posterior
Confluens Sinuum	Occipitalis
Petrosus superior	Sigmaeides
Petrosus inferior	Basilaris (Plexus)

- 25. Sketch the position of the various sinuses on page 200.
Review all the bones forming the floor of the Cranial Cavity.



X L I
BRAIN AND CRANIAL NERVES

A. TOPICS FOR DISCUSSION. Central Nervous System. External Topography of the Brain.

B. SPECIAL STUDY

Divisions of the Brain:

	Prosencephalon (Fore-brain)	
Telencephalon	Hemispherium	{ Pallium Rhinencephalon Corpus Striatum
Diencephalon (Tweenbrain)	Pars optica hypothalami Pars mammillaris Hypothalami	
	Thalamencephalon	{ Thalamus Metathalamus Epithalamus
Isthmus Rhombencephali	Mesencephalon (Mid-Brain)	
Metencephalon	Pedunculi cerebri	
	Corpora Quadrigemina	
Myelencephalon (Afterbrain)	Rhombencephalon (Hind-Brain)	
	Cerebellum	
	Pons	
	Medulla oblongata	

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Locate and identify the portions of the Brain listed above.
- 2. Identify and define the following lobes of the Hemispherium:

Frontal.....

Temporal.....

Parietal.....

Occipital.....

3. Identify the following fissures of the Brain:
- | | |
|----------------------------|---|
| Longitudinalis cerebri | Hippocampi* |
| Transversus cerebri | Parieto-occipitalis* |
| Cerebri lateralis (Sylvii) | Calcarina* |
| Collateralis, | * On the medial surface of the Hemispheres. |
4. Identify and trace on the Brain the following Arteries and their branches.
Note areas of distribution.
- | | |
|--------------------|---------------------|
| Anterior Cerebral | Superior Cerebellar |
| Middle Cerebral | Basilar |
| Posterior Cerebral | |
5. Sketch and label the component parts of the Circulus Arteriosus (Circle of Willis).
6. Strip away any coverings of the brain being careful not to injure the remaining nerve roots.
7. Identify on the base of the Brain and define:
- | | |
|-------------------------------|-------|
| Bulbus olfactorius | ..... |
| Tractus olfactorius | ..... |
| Chiasma opticum | ..... |
| Tuber cinereum | ..... |
| Substantia perforata anterior | ..... |
| Corpora mamillaria | ..... |
| Uncus gyri hippocampi | ..... |
| Flocculus | ..... |
| Pons (Varolii) | ..... |

Medulla oblongata (Bulb) .....	.....
Pyramis .....	.....
Oliva .....	.....

8. Identify the Lamina Terminalis. Separate the hemispheres and locate the Corpus Callosum at the bottom of the Longitudinal Fissure.
9. Identify and sketch the Sulci and Gyri of the Hemispheres. (Page 210.)

Frontal Lobe

S. Centralis (Rolandi)	G. Centralis anterior
S. Praecentralis	G. Frontalis superior
S. Frontalis superior	G. Frontalis medius
S. Frontalis inferior	(pars superior)
S. Olfactorius	(pars inferior)
S. Orbitales	G. Frontalis inferior
S. Corporis callosi*	(pars opercularis)
(pars subfrontalis)	(pars triangularis)
(pars marginalis)	(pars orbitalis)
	G. Rectus
	G. Orbitales

* On the medial surface of the Hemispheres.

Temporal Lobe

S. Temporales transversi	Fissura collateralis
S. Temporalis superior	G. Temporalis superior
S. Temporalis medius	G. Temporalis medius
S. Temporalis inferior	G. Temporalis inferior

Occipital Lobe

S. Occipitalis transversus	G. Occipitalis lateralis
S. Occipitalis lateralis	G. Fusiformis
G. Occipitalis superior	G. Lingualis

Parietal Lobe

S. Intraparietalis	G. Post-centralis
S. Subparietalis	G. Supramarginalis
	G. Angularis

10. Identify the location of the Nervous Centers on the Brain surface, and indicate their position on page 210.

11. Follow the intracranial course of each of the Cranial Nerve roots and identify their position on the Base of the Brain. Make notes on their character, (Motor-M, Sensory-S), Foramina of passage, and general area of distribution.

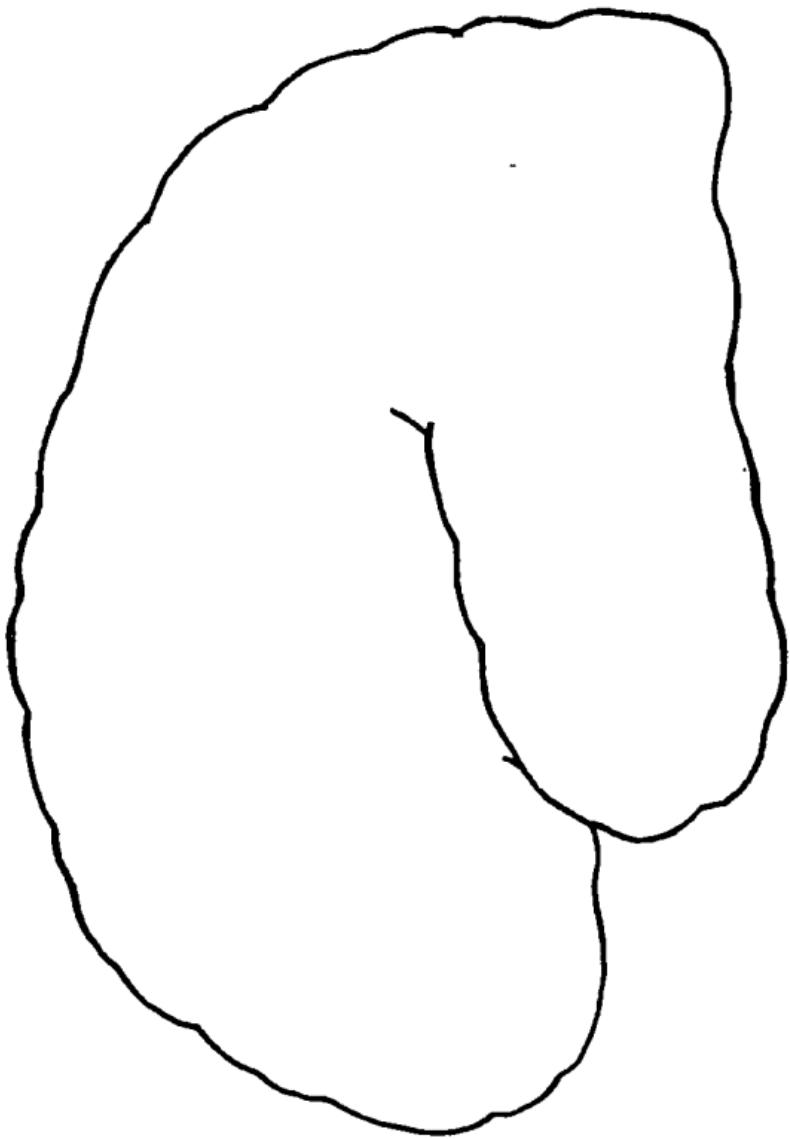
Indicate the ones which have an Intradural tract.

NAME	CHARACTER	FORAMEN OF PASSAGE
I
Distribution.....		
II
Distribution.....		
III
Distribution.....		
IV
Distribution.....		
V
Distribution.....		
VI
Distribution.....		
VII
Distribution.....		
VIII
Distribution.....		
IX
Distribution.....		

NAME	CHARACTER	FORAMEN OF PASSAGE
X
Distribution
.....
XI
Distribution
.....
XII
Distribution
.....

Sketch the position of the Nerve roots on the base of the Brain, and indicate their foramina of passage through the floor of the skull. Include the Semilunar Ganglion (Gasserian) and its three divisions. (Pages 200 and 204.)

HYPOPHYSIS CEREBRI



BRAIN, INTERNAL TOPOGRAPHY

A. TOPICS FOR DISCUSSION. Internal Topography. The Ventricles and Associated Structures.

B. SPECIAL STUDY

Ventriculus lateralis:

Corpus callosum
Septum Pellucidum
Nucleus caudatus
(of the Corpus striatum)
Plexus choroideus
Fornix
Hippocampus

Ventriculus tertius:

Thalamus
Commissura anterior
Optic chiasma
Infundibulum
Massa intermedia
Commissura posterior
Corpus pineale
Corpora quadrigemina

Ventriculus quartus:

Cerebellum
Pons (Varolii)
Medulla oblongata
Brachium conjunctivum
Brachium pontis
Corpus restiforme

Cavum septi pellucidi
(Ventriculus quintis)
Foramina interventricularia
(Monroi)
Aquaeductus cerebri (Sylvii)
Insula (Reil)

C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Separate the Hemispheres sufficiently to observe the surface of the Corpus Callosum.
- 2. Remove the upper portion of the left Hemisphere by cutting parallel slices one-third inch thick until one-half inch above the level of the Corpus Callosum.
- 3. Identify the Cortical and Medullary substance, and the small sectioned blood vessels.
- 4. Examine the medial surface of the Right Hemisphere, tracing the Cingulate Sulcus and Gyrus.
- 5. Cut an oblique slice from the anterior and posterior poles of the Cerebrum about three-quarters of an inch at its thickest point.
- 6. Follow the same instructions for slicing the right Hemisphere.

- 7. Expose the Corpus Callosum by breaking the substance of the Cingulum with a blunt instrument or knife handle. Identify the directions of the transverse fibers of the Corpus Callosum by scraping away the substance lying above them.
- 8. With blunt dissection break away the medial substance anteriorly and posteriorly to expose the fibers forming the Anterior and Posterior Forceps of the Corpus Callosum.
- 9. Identify the Medial and Lateral Longitudinal Striae (Taeniae tectae). Open the medial part of the Lateral Ventricle by a longitudinal cut between the Medial and Lateral Stria.
- 10. Identify the direction of the Posterior Cornu of the Ventricle by inserting a probe; then continue the cut through the roof to its posterior limit. Open the Anterior Cornu in the same manner.
- 11. Identify the Genu of the Corpus Callosum anteriorly, and the Splenium posteriorly.
- 12. Cut the Splenium obliquely on each side (parallel with the wall of the Posterior Cornu) to the midline. Raise the posterior end of the Corpus Callosum, separating it from the underlying Hippocampal Commissure. Remove by cutting transversely across the Genu.
- 13. Identify the following structures in the Lateral Ventricle:
 - Caudate Nucleus (of the Corpus Striatum)
 - Septum Pellucidum
 - Choroid Plexus
 - Fornix
 - Hippocampus
- 14. Examine the Fornix and its parts, Crura, Corpus and Columna. Locate and probe the Interventricular Foramina (Monroi).
- 15. Locate and gently probe the Inferior Cornu of the Lateral Ventricle, noting their course into the Temporal Lobes.
- 16. Identify the Frontal, Parietal and Temporal Gyri which immediately border the Sylvian Fissure, as Opercula. Break away the Parietal Operculum and retract the Temporal Lobe to expose the Insula (Reil) or Central Lobe of the Brain.
- 17. Cut away the lateral side of the Temporal Lobe to expose completely the Inferior Cornu of the Lateral Ventricle.
- 18. Cut the Corpus of the Fornix transversely and reflect it backward. Identify the Tela Choroidea, a double layer of Pia Mater. It serves as the roof of the Third Ventricle.
- 19. Also identify and probe the Cavum Septi Pellucidi, or Fifth Ventricle.

- 20. Trace the course of the Choroid Plexus, and study the Hippocampus, also its Dentate Fascia and Fimbria. Identify the Internal Cerebral Veins and trace to their union to form the Vena Cerebri Magna.
- 21. In the Third Ventricle identify the Thalamis, the Anterior Commissure, Lamina Terminalis, Optic Chiasma (Massa Intermedia), Posterior Commissure. Identify the relation of the Pineal Body, Corpora Quadrigemina, and the Optic Chiasma to this Ventricle.
- 22. Locate and probe the Aqueductus Cerebri leading to the Fourth Ventricle, also the extension, Recessus Infundibuli, of the Third Ventricle into the stalk of the Hypophysis.
- 23. On the under surface of the Brain, identify the position of the Corpora Mammillaria and Cerebral Peduncles in relation to the floor of the Third Ventricle.
- 24. Depress the Cerebellum and locate its upper and middle peduncles, the Brachia Conjunctiva prolonged from the Cerebrum, and the Brachia Pontis from the Pons. By lifting the lower border of the Cerebellum, identify its lower peduncles, the Restiform Bodies, from the Medulla.
- 25. Cut the Cerebellum in midline through the Vermis (central portion) and separate the halves to open into the Fourth Ventricle. Identify its anterior wall as the posterior surface of the Pons and Medulla, and its lateral walls as the Brachia Conjunctiva and Restiform Bodies.
- 26. Examine the roof (posterior wall) of the Ventricle, identifying the Medullary Velum lining it, the Choroid Plexus, and below the latter, the Foramen of Magendie by which the Ventricle communicates with the Subarachnoid space. Laterally on each side are similar openings, the Foramina of Luschka.
- 27. Make transverse vertical sections through the Brain and its stem, through the following points:
 - a. Anterior Commissure
 - b. Massa Intermedia
 - c. Posterior Commissure
- 28. Study all the sections to identify the location and extent of the following structures:

Caudate Nucleus	External Capsule
Internal Capsule	Clastrum
Lenticular Nucleus	Amygdaloid Nucleus
Globus Pallidus	Anterior Perforated Substance
Putamen	Posterior Perforated Substance
- 29. Cut transverse sections through one Hemisphere of the Cerebellum, to identify the Dentate Nucleus. Also locate the Tonsillae, Flocculi and Uvula; and in the cut section of the Vermis, identify the Arbor Vitae.

30. Section the Medulla similarly in order to identify the Pyramids and Olivary Nuclei.

Give the location of, and define, the following:

CORPUS CALLOSUM

CORPUS STRIATUM

NUCLEUS CAUDATUS

NUCLEUS LENTIFORMIS

PUTAMEN

GLOBUS PALLIDUS

CLAUSTRUM

B R A I N (C O N T I N U E D)

NUCLEUS AMYGDALAE

CAPSULA INTERNA

CAPSULA EXTERNA

INSULA (Reil)

FORNIX

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B R A I N (C O N T I N U E D)

SEPTUM PELLUCIDUM

HIPPOCAMPUS

STRIA TERMINALIS

PLEXUS CHOROIDEUS VENTRICULI LATERALIS

RHINENCEPHALON

THALAMUS

PULVINAR

CORPORA GENICULATA

COMMISSURA ANTERIOR

MASSA INTERMEDIA

COMMISSURA POSTERIOR



B R A I N (C O N T I N U E D)

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PLEXUS CHOROIDEUS VENTRICULI TERTII

OPTIC CHIASMA

TUBER CINEREUM

INFUNDIBULUM

CORPUS PINEALE

CORPORA QUADRUGEMINA

CORPORA MAMMILLARIA

PEDUNCULI CEREBRI

TEGMENTUM

PLEXUS CHOROIDEUS VENTRICULI QUARTI

BRACHIUM CONJUNCTIVUM

VERMIS

NUCLEUS DENTATUS

PONS

BRACHIUM PONTIS

CORPUS CALLOSUM

PYRAMIS

NUCLEUS OLIVAE

Sketch a cross-section of the Spinal Cord and label its parts.

B R A I N (C O N T I N U E D)

2 2 2

Briefly describe:
VENTRICULI LATERALES

VENTRICULUS TERTIUS

VENTRICULUS QUARTUS

CAVUM SEPTI PELLUCIDI (Ventriculus Quintus)

OSTELOGY
UPPER EXTREMITY

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CLAVICLE (Clavicular)

X

SCAPULA

STERNUM



NUMERO

RADIUM

CLINA

CARPAL BONES (Carpus)*Proximal Row:***Navicular (Os Naviculare)****Lunate (Os Lunatum)****Triquetral (Os Triquetrum)****Pisiform (Os Pisiform)***Digital Row:***Greater Multangular (Os Multangulum Majus)****Lesser Multangular (Os Multangulum Minus)****Capitate (Os Capitulum)****Hamate (Os Hamatum)**



METACARPALS (Ossa Metacarpalia)

PHALANXES (Phalanges Digitorum Manus)



VERTEBRATE.

General Characteristics

Cervical (Vertebrae Cervicales)

General description

A t l a s

A x i s (Epiphysis post.)

O S T E O L O G Y

2 3 2

Thoracic (Vertebrae Thoracales)

Lumbar (Vertebrae Lumbales)

Sacrum (Vertebrae Sacrales)

Coccyx (Vertebrae Coccygeae)

RIBS (Costae)
General description

First Rib

Second Rib

Tenth and eleventh ribs

Cartilaginous Costae

Innominate (Os Coxae)

Ilium (Os Ilium)

Ischium (Os Ischium)

Pecten (Os Pecten)



OSTEOLOGY
LOWER EXTREMITY

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SYNTH

PATELLA

TIBIA

FIBULA

TAUUS

CALCIANUM

NAVICULAR (Os Naviculare Pedis)

-

CUNIFORMIS (Ossa Cuneiformia)

-

CUBOID (Os Cuboideum)

-

METATARSALS (Ossia Metatarsalia)

-

PHALANGES (Phalanges Digitorum Pedis)

-

O S T E O L O G Y
C R A N I U M

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T E M P O R A L (O s Temporale)

M A X I L L A

T E M P O R A L (O s Temporale)

NASAL (Os Nasale)

Sphenoid (Os Sphenoidale)

Frontal (Os Frontale)

ETHMOID (Os Ethmoidale)

INFERIOR TURBinate (Concha Nasalis Inferior)

FRONTAL (Os Frontale)

PARIETAL (Os Parietale)

OCCLITAL (Os Occipitale)

MANDIBLE (Mandibula)

MAXILLA (Os Maxillae)

PAALATE (Os Palatinum)

STARS

SYNDESMOLOGY
UPPER EXTREMITY

STENO-CLAVICULAR (Articulatio Sternoclavicularis)

ACROMIO-CLAVICULAR (A. Acromioclavicularis)

SHOULDER (A. Humeri)

anastomosis
((A. Cubiti)
(A. Radioulnaris Proximalis))

DISTAL RADIO-ULNAR (A. Radioulnaris Distalis)

distal (A. Radioulnaris)

INTERCARPAL (AA. Intercarpae)**CARPO-METACARPAL (AA. Carpometacarpea)**

Pollicis

Digitorum

METACARPO-PHALANGEAL (AA. Metacarpophalangea)**INTERPHALANGEAL (AA. Interphalangea)**

S Y N D E S M O L O G Y
B O D Y

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INTERVERTEBRAL—general arrangement below Cervical II.

COSTOVERTEBRAL (AA. Costovertebrales)

COSTO-TRANSVERSE (AA. Costotransversariae)

CRASS. VERTERAT (AA. Sternocostales)



SYNDESMOLOGY
LOWER EXTREMITY

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SACRO-ILIAC (A. Sacroiliaca)

PUBIC SYNPHTYSIS (Symphysis Ovastris Pubis)

ISCHIUM (A. Cetaria)

genu (A. Genu)

CORNER TIBIO-FIBULAR (A. Tibiofibularis)

TIBIO-FIBULAR SYNOCHYSIS (Synternous Tibiofibularis)

tibia (A. Tibialis)

TALO-CALCANEAL (A. Talocalcanea)

TALO-NAVICULAR (A. Talonavicularis)

CALCANEO-CUNOID (A. Calcaneocuboides)

CUNEO-NAVICULAR (A. Cuneonavicularis)

TARSO-METATARIAL (AA. Tarsometatarsis)

Middle

Dorsum

METATARSO-PHALANGIAL (AA. Metatarsophalangeal)

INTERPHALANGIAL (AA. Dicitorum Pedis)

HEAD

OCITO-ATLANTIC (A. Occipito-atlantica)

ATLANTO-AXIAL (A. Atlanto-axialis)

DISPENSER (A. Maxillary)

